COAL AGE

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The Point of View

Our troubles are the tools by which our characters are fashioned and the stones out of which we build our temples of success.

WHAT anything *is*, depends less on its make-up than on the way we view it. Two men, examining the same object or listening to the same argument, have views at entire variance about it, and the viewpoint is of more importance than the thing itself.

One man picks up a burden with a whine, another with the cheerful air of a man who is bent on chest expansion. To the whiner the burden is a distressing load; to the purposeful man merely another opportunity.

Just so, Fulton's steamboat looked very different to Fulton than it did to Napoleon. Had Napoleon viewed it rightly, it would have enabled him to have invaded England without waiting for wind and tide. He would not have been obliged to see his opportunities pass away with his flapping sails.

A story will illustrate the effect of the point of view. The general superintendent of a well-known concern needed a superintendent for one of his mines. He consulted with his general manager, a grizzled veteran in the business—the kind of manager who always insists on knowing the caliber of the men who become superintendents for his company. The general superintendent named a man for the place who was known to possess practically all the essential requisites. But the "Big Boss" waved him aside and said:

"No, I want that foreman you have over at X Mine to have that job."

"Why, Mr. ———," replied the other, "that man has too many troubles of his own to hold that job. Don't you know he has a paralyzed mother and an invalid brother to take care of, to say nothing of his own family? He's in debt, too. Why that man has more family troubles to take care of than any fellow in our employ. I don't see how he'll find time to be a mine superintendent."

"How long has he been foreman at X?" asked the G. M.

"About five years."

"Hasn't he made good?"

"Yes," said the superintendent, "he has, but I don't see how he does it."

"Well, I do," said the general manager. "He does it because he's the kind of man that gets under responsibility and carries the load like a *man* should. You give him that job—if he doesn't make good, you can put your man in without asking me any questions. That fellow has every necessity urging him on, and what's more, he knows what personal troubles are good for. He looks on troubles of any kind as things to be overcome, and that's the kind of a man I want around my coal mines."

Ideas and Suggestions

A Survey Stake That "Stays Put"

The ordinary survey stake as used by the engineer is so made as to be very easily knocked out of position. This defect is due to the way in which the stake is sharpened, says N. S. Mulligan, of Thomasville, N. C., in the *Engineering News-Record*.

The stake sketched on the left-hand side of the accompanying figure is sharpened in the manner most generally in use and may be described as a straight stick sharpened only near the end with a short slope from both sides. When such a stake is driven, the point is the only part firmly seated, for the body of the stake is as large just above the point as the rest of the way up, so that the stake just stands in a hole made by the point. This shape accounts for the ease with which most stakes are displaced. If the stake be made of the form shown by the figure at the right, it will be found to give greater satisfaction. This stake is sharpened only on one side, but the slope extends three-fourths the length of the stake. When driven into the earth, the stake is held very much more firmly than is the other kind, because the taper is much longer and therefore the earth adheres to a greater length of the stake. It is very difficult to draw this type of stake out of the earth when once driven in. If exposed to traffic, as in the case of streets and highways, the stakes are sometimes broken off at the ground, the stake breaking before it pulls up. In this case the point is still in position and can be found and replaced.

WRONG AND RIGHT WAY

On one occasion a test was made of these two types of stakes on a highway on which the traffic was very heavy. The following was the result: Equal numbers of the two kinds of stakes were used, under equal exposure, yet 14 per cent. of the first type and only 2½ per cent. of the other type were lost.

Eschkas Method of Determining the Sulphur in Coal

By Charles W. Wardrop*

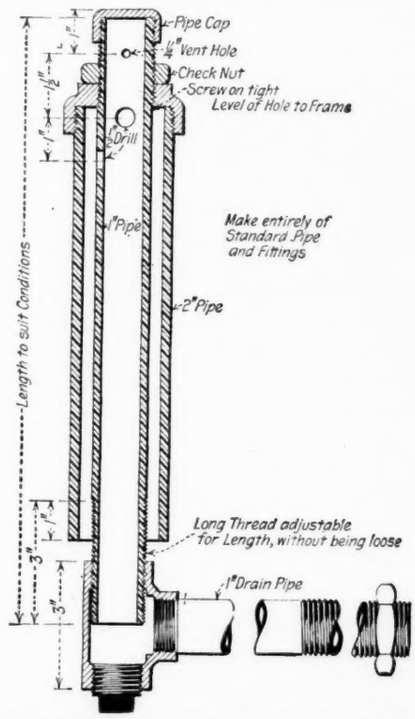
To determine the sulphur content of coal weigh out ½ gram of a pulverized sample and place it in a porcelain or platinum crucible together with ½ gram of Eschka's mixture. (Eschka's mixture contains 33⅓ per cent. of magnesium oxide and 66⅔ per cent. of sodium carbonate.) Mix thoroughly; heat slowly at first, then gradually, until the carbon is driven off or until the contents of the crucible become white in color.

Transfer the contents of the crucible to a glass beaker containing about 200 c.c. of water; wash thoroughly, then add 15 c.c. of a 10 per cent. solution of bromine water. (Bromine is an oxidizing agent and takes up the sulphur.) Let settle and filter off the impurities. Boil the filtrate for 5 min. then, drop by drop, add 15 c.c. of a 10 per cent. solution of barium chloride ($BaCl_2$); let settle for a few hours; filter, and retain precipitate. Its weight × 2 × 0.1374 (the factor that gives the amount of sulphur) × 100 gives the percentage of sulphur in the original sample.

*Pittsburgh Gas Coal Co., Iselin, Penn.

Engine-Frame Oil Separator

In some engines using the splash system of oiling there is a false head placed in the end of the crosshead barrel or end of the frame, and the rod is packed with two or three rings of packing, forming a reservoir for the water that may work out from the cylinder through the packing and prevent it from getting into the oiling system. Some oil works into this space which, if wasted with the water, would mean considerable loss in a year. In order to save this oil, there is a hole through the false head at a certain level and the oil is supposed to drain back into the frame, and the water must be drained off at the bottom at intervals to prevent it from flooding over into the oiling system.



BOTTOM INLET TO OVERFLOW DRAIN

Such engines may be equipped with a drain for the water, made as shown in the illustration, by means of which the oil is saved without allowing water to get into the oiling system. The separator is placed within the reservoir space with the drain pipe extending out at some convenient point, and the action is as follows: The water rises in the outer pipe until it reaches the level of the

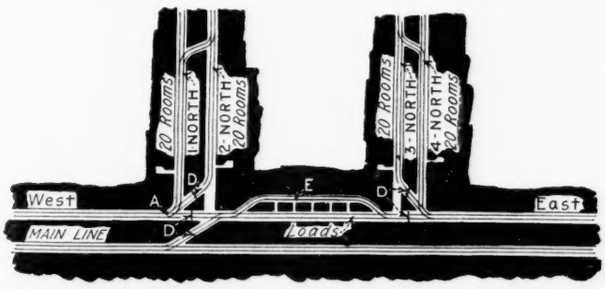
holes in the inner pipe, when it flows down the inner pipe and out to the sewer. The height of the overflow holes in the inner pipe is just below the level of the oil hole in the frame, so that the water cannot rise high enough to flow into the frame unless the drain pipe becomes stopped up. A siphon action is avoided by the vent hole at the top, and the oil is drained back into the engine frame through the regular overflow.—*Power.*

Gathering-Locomotive Parting

By Harry Mills*

The accompanying illustration shows a gathering-motor parting that is being used successfully in a southern Illinois mine. I helped to install these partings and have had them in use about 30 months. I have read *Coal Age* for many years and have been at many mines, but I have never seen a parting of this type described, and only at this mine have I seen one in operation.

The operation of this gathering-motor parting allows the motors to be free to gather an extra trip after the parting is full of loads, or during a wait for the big motor. The gathering motor takes 10 or 20 empties from the empty track on parting *E* and hauls them west until the last car clears the switch *A*, which is then thrown for 1st North. The motor pushes the cars up the entry,



GATHERING PARTING IN SOUTHWESTERN ILLINOIS

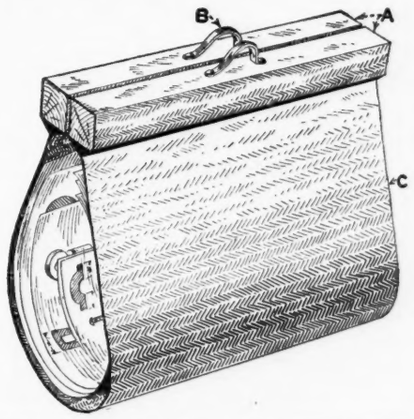
the trip rider throws the room switches, and the cars are pushed into the rooms. After the empties are delivered, the motor crosses to 2nd North and gathers loads from the last room first, continuing down the entry.

The motor then pulls the loads into the west entry, until they clear the switch *A*. It then proceeds to push the loaded cars onto the parting. After delivering its loads, the motor is ready to deliver empties to 2nd North and, crossing over, gathers loads from the 1st North.

It requires two gathering motors for this plan in order to keep the parting full of coal for the haulage motor. This parting is in successful operation in one of the steadiest-working 3000-ton mines in southern Illinois. Each motor gathers 175 to 200 loads daily of 2¼ tons capacity net.

Handy Carry-All for Drafting Room

It is customary for drafting rooms to place their drawings, either every night or once a week, in a vault for safe keeping. The device for carrying drawings herewith illustrated was described by F. E. Potter in the *American Machinist*. It is easy to make, all that is needed being two pieces of white pine *A* 37 x 1¼ x ¾ in., two black japanned door pulls *B* and a piece of unbleached cloth *C* 37 x 30 in. If the carry-all is likely to be laid down, a small hook and eye can be attached at each end of the wood crosspieces to hold them together and prevent the loss of the drawings. Otherwise

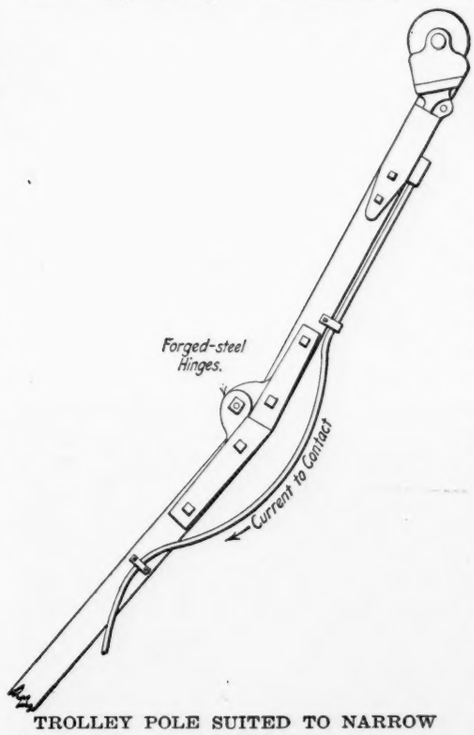


GRIP TO HOLD DAY'S DRAFTING WORK

the grip on the two handles will serve all the purposes of a fastening. In fact the carry-all can be suspended from a hook in the vault, thus taking up a minimum of space and holding the drawings ready for removal at any time.

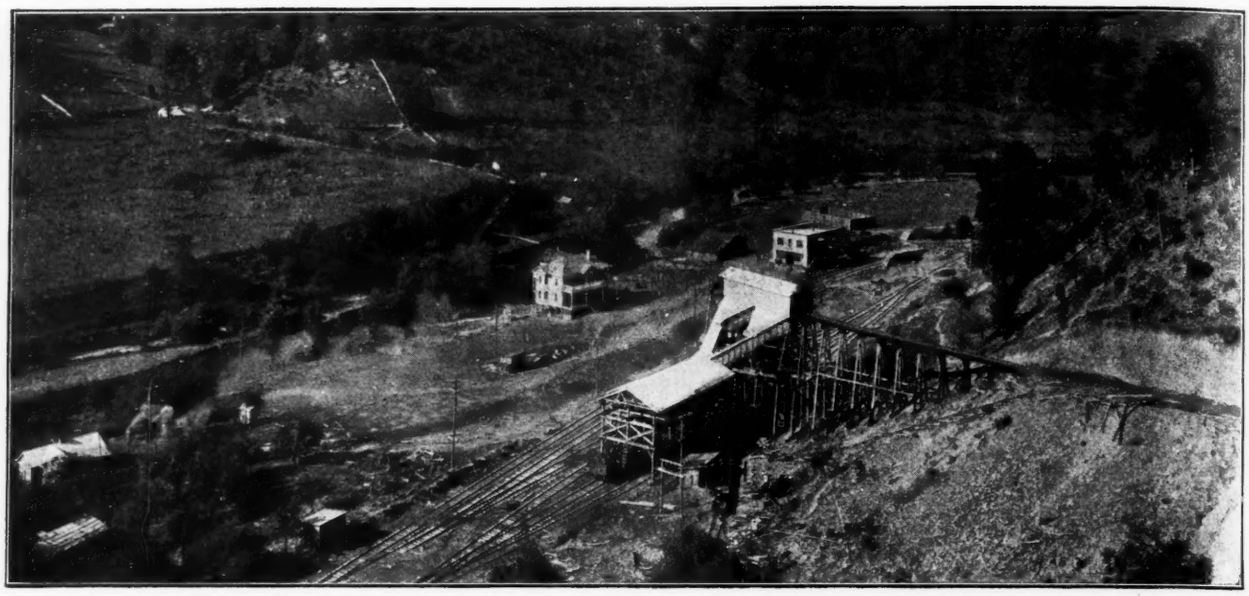
Collapsible Trolley Pole Facilitates Reversal in Narrow Roadways

The accompanying sketch, reproduced from a recent issue of the *Engineering and Mining Journal,* to which it was contributed by D. E. Charlton, of Virginia, Minn., shows a collapsible trolley pole for use on underground locomotives. The pole is made in two sections—the upper part making the contact with the trolley wire and the lower part setting on the pole base. A forged-steel hinge, which connects the two parts, is so placed that the pole can be doubled back when removed from the wire, permitting it to be turned through 180 deg. in a smaller space than if the pole were constructed of one piece. The tension spring at the base of the pole maintains a pressure on the pole and so prevents collapse.



TROLLEY POLE SUITED TO NARROW ROADWAYS

*Waverly, Mo.



New Coal-Mining Development in Kentucky

SYNOPSIS—Kentucky is fifth in rank of the coal-mining states of the Union and rapidly advancing. A description is given of the workings of a modern operation in the Harlan County field.

The various manufacturing interests of the country should watch keenly the development of coal mining in Kentucky—the fifth and most rapidly advancing state in the production of fuel. The prediction made more than 40 years ago that the future center of the iron and steel industry of the United States would be located somewhere in eastern Kentucky appears to be nearing fulfillment. This forecast was based upon geological surveys which revealed the fact that 40 per cent. of the surface of Kentucky was underlain with coal, much of it the finest by-product coal in the country. Kentucky, though one of the oldest producers of commercial coal—it has been a producing factor since 1872—has been slow in reaching an era of large production.

It is the consensus of opinion among mining experts that Kentucky will eventually become first among the coal-producing states, for it has available 120 billion tons of coal. The production of the state in 1879 had reached an output of one million tons. In 1900 the production was nearly five million tons. In 1916 the output had jumped to about 25 million tons, an increase over that of 1915 of 3½ million tons, despite a car and labor shortage, suspensions and strikes. Kentucky became fifth among the coal-producing states in 1912, the order being Pennsylvania, West Virginia, Illinois, Ohio and Kentucky.

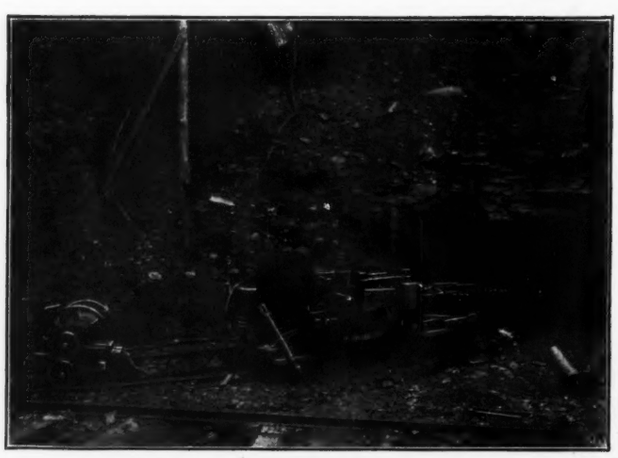


FIG. 1. STRAIGHT-FACE COAL CUTTER AT MINE MOUTH

Kentucky's 120 billion tons of coal yet to be mined, however, is far more than the present supply of bituminous coal in any of the competing states. The gain in some of the eastern counties has been such as to give some idea of what may be expected in another five years if normal conditions prevail.

Particular importance is being attached to the development of the Harlan County field, the greatest coal county in the state—the number of workable seams of high quality and the tonnage it is possible to mine per square mile being considered. Harlan, which produced no commercial coal until 1911, when its output amounted to only 25,814 tons, in 1916 produced a total of 1,710,970 tons.

The great increase in coal production all over eastern Kentucky during 1916, according to one authority, has been coincident with a higher level of coal prices and has brought great wealth to this part of the state. Seventy-five per cent. of the cost of producing this coal has gone to labor. During the past year there have been increases of from 10 to 30 per cent. in the rate of wages paid to practically all classes of coal-mine labor, the operators viewing the continuance of harmonious relations between employer and employee of vast importance in the future development of their business.

Another important consideration in the future of the coal industry in Kentucky is the necessity for large manufacturing enterprises to locate in or contiguous to the field; also in the adjustment of freight rates which will enable the operator to find a market for the surplus output in that expanse of territory stretching from the Dakotas to the Gulf of Mexico. One of the present aims of the eastern Kentucky operators is to secure an entrance

into the great business on the Lakes, involving the establishment of a freight rate to Toledo or other Lake Erie ports, with a view to trans-shipment to Duluth and the Northwest in boats. A watchful eye also is being kept on the future of the export coal trade of the United States, but to share in this trade the Kentucky operators must find an outlet to Atlantic seaports. With competitive rates to the seacoast, to the Great Lakes and to the inland markets of the eastern half of the United States, says one operator, eastern Kentucky will enter an era of activity.

The use of electricity in coal mining has been brought to a high degree of perfection by a number of the eastern Kentucky operators, particularly in the Harlan field. Numerous features of interest to the mine engineer will be found in the methods and equipment employed by the King-Harlan Mining Co., one of the modern plants of Harlan County. This is a $200,000 concern with head offices at Nashville, Tenn. It has practically the full amount of its capital invested in its plant, which is located on the Clover Fork of the Cumberland River.

The first coal mined by this concern was run through the tipple in March, 1916, and the production at the present time is about 600 tons daily. The equipment, however, is designed to handle 2000 tons a day. According to A. H. Wood, of Kilday, Ky., general manager and secretary of the company, the output of the King-Harlan mines is being marketed in sixteen states. In coöperation with other operators in this field, plans are being made to increase largely the demand for Harlan County coal in the markets of the North and Northwest and, if possible, to invade the South American markets.

Mr. Wood, who is a mining engineer of 25 years' experience and well known throughout the South, planned the development of the property. To minimize deadwork the mine is operated without roof brushing, bottom lifting or other avoidable unproductive items. The Kentucky Utilities Co. supplies the power at 2300 volts, three-phase, off its 33,000-volt transmission lines. Transformers reduce the voltage for lighting the town and mine, actuating the pumps, driving the motors in the tipple and shops, and operating the Goodman alternating-current straight-face cutting machines employed in the mines.

Inside the mine the seam is worked by two openings—main and secondary. In order to reach a small acreage in a spur of the mountain, the secondary opening shown in the leading view was made. The main opening into the principal body of the coal is laid out for development with triple main entries, the air going in on the sides and returning on the middle entry, where the main haulage is maintained. Room entries are driven quadruple, so the rooms may be turned to the right and left off outer entries, with a separate return air course and haulageway for each panel of rooms. All entries and other narrow work are driven 16 ft. wide. With admirable roof and bottom conditions, the mine is worked on a novel plan whereby the rooms are advanced with 60-ft. faces, following which a certain amount of timber is used, though the necessity of this latter is questionable.

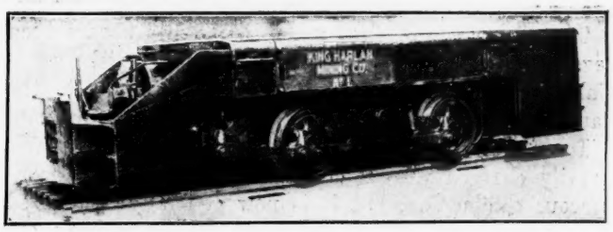


FIG. 2. KING-HARLAN TYPE OF LOCOMOTIVE

For each room two 16-ft. crossovers are driven from inner to outer room entry, 28-ft. apart, and continued as double roomnecks with a pillar between. The two 16-ft. cuts, plus the 28-ft. pillar, make a total of 60 ft. The 28-ft. pillar is maintained for a distance of 30 ft. and then a 20-ft. cut from neck to neck is made. This cut establishes the 60-ft. room face, reached by two 16-ft. roomnecks, with a supporting pillar 28x30 ft. The quadruple room entries are so spaced as to leave 500 ft. between the outer air course of each set, thus enabling the driving of rooms to run together at a depth of 250 ft. from their respective air courses. Pairs of rooms are spaced to leave 24-ft. pillars between rooms. Mining is done wholly with Goodman straight-face machines.

The illustration at the head of the article shows the tipple, railroad yards, company store and hotel at Kilday; Fig. 2 is a view of the first of a new type of locomotive, weighing 8½ tons, which was built for the King-Harlan Mining Co. in accordance with designs furnished by General Manager Wood. Fig. 3 illustrates the making of a room-neck cut with a Goodman alternating-current machine.

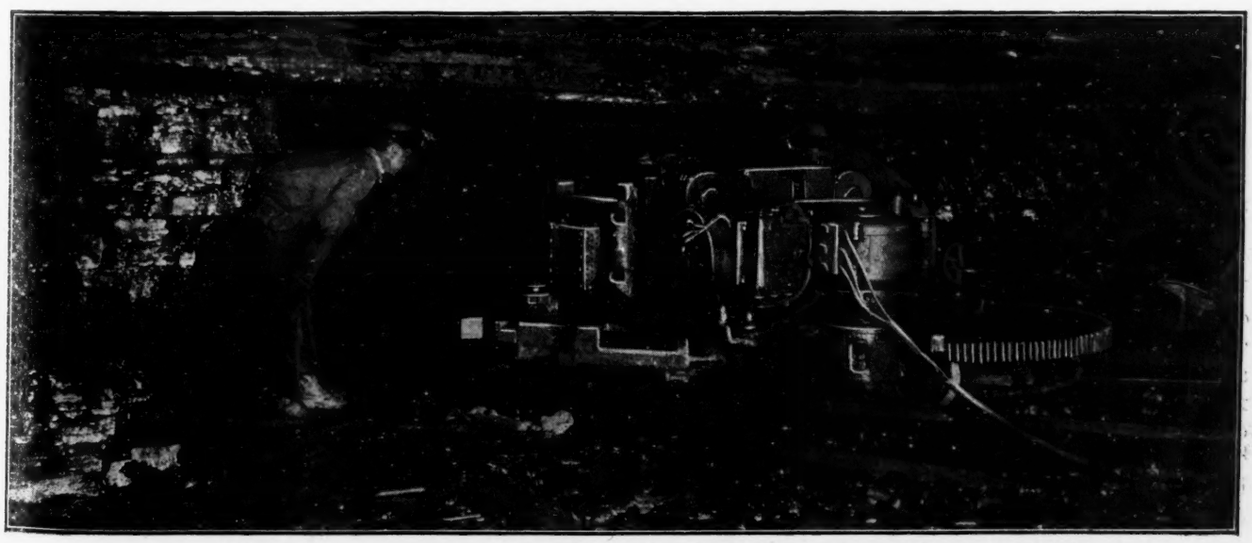


FIG. 3. CUTTING A NOTCH IN THE RIB PREPARATORY TO STARTING A NEW ROOM

Spontaneous Combustion in Coal Mines

By Rowland Gascoyne*

SYNOPSIS—The author describes in detail the many causes responsible for fires underground due to spontaneous combustion, tells what precautions to take in order to minimize this risk, and gives methods for successfully attacking or sealing off mine fires when they have been discovered.

The occurrence of fires underground has always been regarded as one of the greatest coal-mining risks, especially in mines that are classed as fiery owing to the danger of explosions due to the accumulation of firedamp.

It was formerly considered that only those coal seams heavily charged with iron pyrites were liable to spontaneous combustion, but it is now generally recognized that spontaneous combustion in coal mines is due more to the oxidation of the coal itself than to the presence of brasses or iron pyrites in the coal. It is true that in shallow mines falls to the surface frequently cause spontaneous combustion to make its appearance provided steps are not taken at once to stop the passage of air through the falls; but it may be taken as a rule, that deep mines are more liable to the outbreak of fires from spontaneous combustion, through the oxidation of the coal, than shallow mines.

Spontaneous combustion seldom takes place in anthracite coal or coke, probably on account of the almost entire absence of volatile matter. The process of oxidation is always going on in bituminous mines, but it is rarely noticed until spontaneous combustion is close at hand or has actually occurred. In a deep bituminous-coal mine, the temperature is probably materially increased by the oxidation of the coal which is constantly in progress. Even the face of a solid coal seam will show a higher temperature for the first foot than at a further depth of two or three feet.

Temperature Decreased with Depth in Seam

The writer once tested the temperature of a bituminous-coal seam at a depth of 1400 ft. from the surface and was surprised to find that a borehole 1 ft. in depth in the seam registered with the thermometer 84 deg. F.; at 2 ft. in depth the temperature was 82 deg. F. and at a depth of 3 ft. 80 deg. F., a result which seems to show that oxidation was going on at the face of the coal. In small ribs of coal, and especially in fine coal, it is recognized that spontaneous combustion is far more easily set up than in pillars or in a solid face of coal provided the necessary supply of air and moisture is present.

A limited supply of air and moisture seems essential for this process of oxidation to take place, and once the spot is deprived of air the oxidation seems to cease. On the other hand, a plentiful supply of air has the same effect. Of moisture there seems always an ample supply available, both in the coal seam and in the atmosphere of the mine. The longwall method of working is more conducive to spontaneous combustion than the pillar-and-stall system, especially where the goaf is not stowed solid behind the workings and coal, either in the shape of fines or as a roof, is left behind.

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Wastes with a bad roof and an abundance of cracks and fissures, provided the other necessary conditions are present, are also conducive to gob fires. Then in longwall workings, fault lines allow air to find its way into the goaf and set up oxidation that often results in spontaneous combustion. Another fruitful cause of spontaneous combustion in longwall mines is the leaving behind in the goaf of timber or small ribs of coal, to protect a bad roof or a newly recovered working place after a fall. Badly built or insufficient packs in a deep longwall mine will also be responsible for the appearance of spontaneous combustion underground. Difference of air pressure has also caused oxidation to set up in the goaf, and even sudden changes of the barometer have been known to start an underground fire.

Ventilate Idle Coal Well or Exclude All Air

Prevention in the case of underground fires is always better than the most radical cure. The most effective methods of prevention are either to freely ventilate the abandoned areas or to shut off the air altogether. There are few longwall mines where these methods can be applied. In a deep longwall mine there is always a risk of spontaneous combustion starting immediately after the shaft pillar is left behind, as there is in fact close to any pillar left behind in the goaf. The leaving behind of pillars in longwall working should always be avoided as much as possible.

As shaft pillars are necessary and unavoidable, the best plan to avoid an underground fire is to stow the goaf solid for some distance from the pillar, and either well ventilate the edges of the shaft pillar or take such steps as will prevent air leaving the edges of the pillars. Solid coal in the shape of large pillars does not take fire readily, but the risk occurs where the roof above the pillar is broken and contains thin laminations of coal. Great care must be taken to prevent leakage of air along fault lines or through badly built packs, and on no account should timber, ribs of coal, or anything liable to prevent the goaf closing up solidly be left behind.

During abnormal changes in the barometer, mine officials must not only be unusually alert for the discovery of firedamp, but also for signs of sweating in the goaf, or the presence of "fire stink," by which name the smell accompanying the earliest stages of a gob fire is known. It is worthy of notice that in a heating goaf, firedamp does not seem able to exist.

Explosions caused by firedamp coming in contact with gob fires have not as a rule the same zest and explosive qualities as where there is ample fresh air to feed the explosions. The resulting atmosphere of firedamp coming in contact with a gob fire is, however, exceedingly deadly, and many lives have been lost in consequence. For this reason, where such an explosion has occurred, the number of persons allowed below ground, even for rescuing purposes, should be kept as low as possible. The leaving of a thin seam of coal as a roof or over packs in the goaves of longwall workings is also a fruitful cause of spontaneous combustion, but this cannot always be avoided.

As stated before, the best method to prevent these underground fires is to stow the goaf solid with waste,

while the throwing of small coal behind is often the cause of spontaneous combustion. A good method of working to prevent these underground fires is to work pillar and stall or the retreating longwall by the panel system. The entries to the panel must be kept down to the lowest number, and when the coal is worked out these must be made perfectly air-tight by the building of good brick stoppings.

If the retreating longwall method of working in similar panels is adopted, an underground fire does not possess the same terror. It is always best to extinguish it if possible, but with this method of working the fire is at once smothered and the face advanced or rather retired from the seat of the fire as rapidly as possible. Much will depend on the surrounding circumstances, but the fact that there exists an airproof barrier all round the seat of the fire reduces the risk to a minimum.

With close observation and practice it is not a difficult matter to discern the preliminary stages of spontaneous combustion. As soon as oxidation and heating begin, a peculiar odor is given off, but there are some mine officials who seem quite unable to detect it.

When Burning Odor Is Observed Act At Once

The moment this odor is detected some attempt must be made to discover its origin. If promptly traced an outbreak of fire may be prevented, but once actual combustion breaks out the difficulty is immensely increased. Sometimes the admission of fresh air will put a stop to the sweating and oxidation, and thus prevent spontaneous combustion; at other times it may hasten the action.

There are several ways of dealing with underground fires once they have made their appearance, each method having its own particular advocates. Some will insist upon getting at the seat of the fire direct and, by the aid of water if available, immediately commence to fill the fire out. Others, by surrounding the seat of the fire, will attempt to isolate it by the construction of stoppings, while still others will be satisfied to surround it by clay walls or sand banks. The best method of dealing with an underground fire must after all depend upon the surrounding conditions and circumstances.

Whatever method is decided upon, however, there must be promptitude of action, as any delay in decision may increase the difficulty of handling the fire and possibly lead to ultimate disaster. When it is only possible to approach the seat of a fire on the return side, or such an approach is deemed advisable, the use of helmets may become absolutely necessary. Safety appliances have come into such extensive use of late years that no mine subject to spontaneous combustion should be without them; for when tackling underground fires their value cannot be too highly appreciated.

Never leave a fire until it is well under control. If it is found that it has got a firm footing, get it as much under control as possible by surrounding it or covering it with sand, clay, or similar impervious material, so as to keep as much air as possible from getting to the seat of the fire. If despite this attempt at control the fire shows signs of further extension, the next best course to adopt is to build a solid 3-ft. wall backed by sand in a solid manner, and so entirely isolate the fire from the surrounding workings. The fire will then probably die out for want of air. If conditions permit, water may be introduced behind the brick stopping, and so assist in extinguishing the fire. So long as the fire is allowed to exist there is some risk and danger, and that is why wherever possible removal or total extinction is to be recommended.

In the case of panel working, many will be satisfied if they can keep the fire under control by smothering it with sand or walls of clay. This method generally succeeds if the method of working is retreating longwall, and after shutting all possible air off from the fire the speed of the working face is accelerated as much as possible and the goaf closed up as much as possible behind. If, however, it does not succeed, the results are frequently serious, as it may involve the complete loss of that panel. This system of leaving a fire to take care of itself would never answer in ordinary longwall working, as it is difficult to see where the trouble is going to end. Whole districts and mines have been lost through failure to tackle a fire in time, after incurring considerable expense in trying to control it after it had got too great a hold.

Many advocate the prompt isolation of the fire before attempting to fill it out. In longwall working this necessitates the building of a thick brick wall, well let in to the roof and floor, backed with sand all round the fire, and then leaving the fire to its fate. A traveling way must be kept open all round the wall for observation purposes. In a case like this there is always the risk that air may get to the fire through a crevice in the roof or floor, and the fire may creep along such crevices and set fire to the ground beyond the wall.

Difficult To Isolate a Fire in Longwall

Sometimes underground fires caused by spontaneous combustion break out afresh after they have been placed well under control. The step necessary in such cases will depend upon circumstances. If the mine is worked by pillar and stall, it may be possible to isolate the fire by the erection of stoppings as close to the fire as possible and thus suppress and eventually extinguish the fire by its own fumes. In longwall working, owing to the broken nature of the ground, it may not be possible to find solid ground close to the fire in which to erect the stoppings. In such a case the erection of stoppings may throw a considerable area of the mine idle. Sometimes in fiery mines the stoppings are blown out, and their renewal is a matter of careful consideration and considerable danger. It may necessitate an entire change in the method of ventilation, which in itself may be attended with much risk to those engaged in the operation.

If it is found impossible to put in these stoppings with safety, the next point to consider is whether that particular part of the mine can be flooded with water and thus isolated from the rest of the mine. The complete flooding of an underground fire with water is almost certain to extinguish the fire, but water cannot always be easily applied, and sometimes such a drastic cure may be worse than the disease. If the fire exists in dip workings, and especially anywhere near the lowest point of the workings, flooding may easily be resorted to; but if the fire exists in a high part of the workings, then flooding becomes a very difficult operation. The question then to be decided is whether it would not be better to seal up the mine. No one but those who have had actual experience of flooding a mine with the object of putting out a fire can imagine the damage it does, especially if the roof or

floor is bad. The delay and cost of reopening the mine is enormous. Flooding, therefore, should only be resorted to when all other measures have failed.

It must not be overlooked that frequently in flooding a mine, more especially the rise workings, air-locked chambers are frequently formed, and these may occupy considerable areas impossible to locate. In applying water on a comparatively small scale in the extinction of a fire, sometimes the water seems to drive fire into crevices, only to return when the application of the water has been suspended. Burnt material which has the appearance of having by the application of water become incombustible will frequently burn over again when the water has been withdrawn, thus showing how necessary it becomes to fill out a fire if possible.

Pumping gas into fires has also been tried with the object of extinguishing them, but the results are not always satisfactory, as the fire after being apparently extinguished by the gas will frequently burst into flame again when the stoppings are removed.

If sectional sealing off of the affected areas of the mine has not been successful in extinguishing the fire, or for some reason cannot be applied with any hope of success, then it becomes a question to decide whether in face of the damage always inflicted on the underground workings by flooding with water it would not be better to seal up both the shafts. In a deep mine with intact workings and no possibility of any communication from the outcrop to the underground workings, this no doubt would be the best step to pursue; but in a shallow mine in communication with the outcrop, the complete sealing off of the underground workings becomes difficult and expensive.

"Helping Henry" Auxiliary Drive

A device, called somewhat jocularly a "Helping Henry," can be readily attached to an automobile so that the motor on the machine may be used to perform some operation for which auxiliary power is required. For

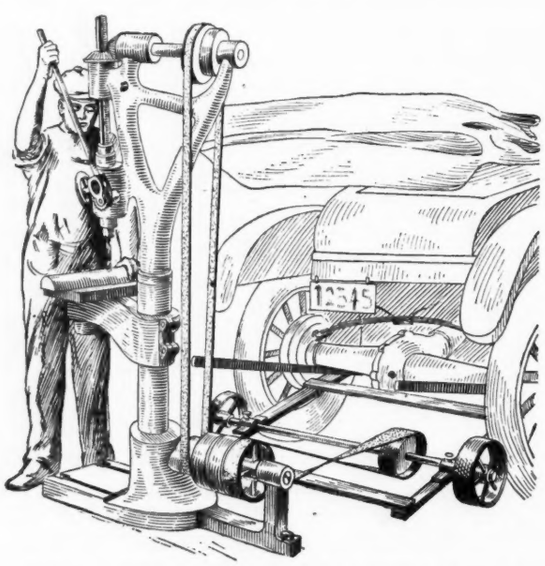


FIG. 1. AUTOMOBILE DRIVING DRILL PRESS

some reason the pressure of steam at a small plant may be low, the engine may be undergoing repairs or the electric motor may be unable to run because central-station power is temporarily unobtainable.

In these and other like cases it is a simple matter to back an automobile to the window of the building in which the power is needed or to run the "flivver" onto the floor of

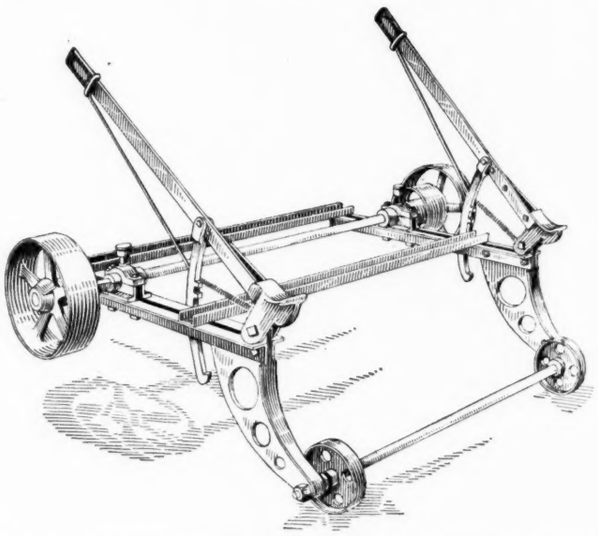


FIG. 2. DEVICE PERMITTING USE OF AUTOMOBILE AS STATION ENGINE

that building. In a trice the device can be applied to the automobile and can be belted to the machine that is to be driven. Everything is then ready to start, as can be seen in Fig. 1, where the automobile is represented driving a drill press.

The device (see Fig. 2) consists of a steel frame upon which a couple of jacks are mounted. These are placed under the housing of the rear axle. When the jacks are brought against the housing, the rear wheels of the automobile are lifted from the ground, and the tire treads are brought against two wide rim pulleys mounted on a shaft. To this same shaft a belt pulley is secured from which a belt is run to the machine to be driven.

When the automobile is started with the driving mechanism in contact, power is transmitted from the tires to the pulleys on the shaft, revolving them and thus driving the drill press, lathe, or other mechanism. The device is made by the Auto Power Co., Laporte, Ind.

Inflammability of Mine Gases

In Technical Paper 150, the Bureau of Mines, through George A. Burrell and Alfred W. Gauger, has presented many interesting facts regarding "The Limits of Complete Inflammability of Mixtures of Mine Gas and of Industrial Gas with Air." The bureau has apparently decided not to treat "complete inflammability" as a synonym for "explosion." At the limits of the former there is certainly nothing sufficiently violent to justify the use of the latter expression.

The limits of complete inflammability are given as follows: Gasoline vapor, 1.5 to 6; ethane, 2.5 to 5; methane, 5.5 to 14.5; natural gas, 5 to 12; acetylene, 3 to 73; artificial illuminating gas, 7 to 21; hydrogen, 10 to 66; carbon monoxide, 15 to 73; blast furnace gas, 36 to 65. The limit for methane can be lowered to 5 with ignition from below. This, the bulletin points out, is unusual in the mines. Horizontal ignition with gasoline vapor and air gives 2.0 as the low limit of complete inflammability, as against 1.5 for ignition from below.

The Romance of Refrigeration and Its Application to Mining*

By Andrew D. Brydon†

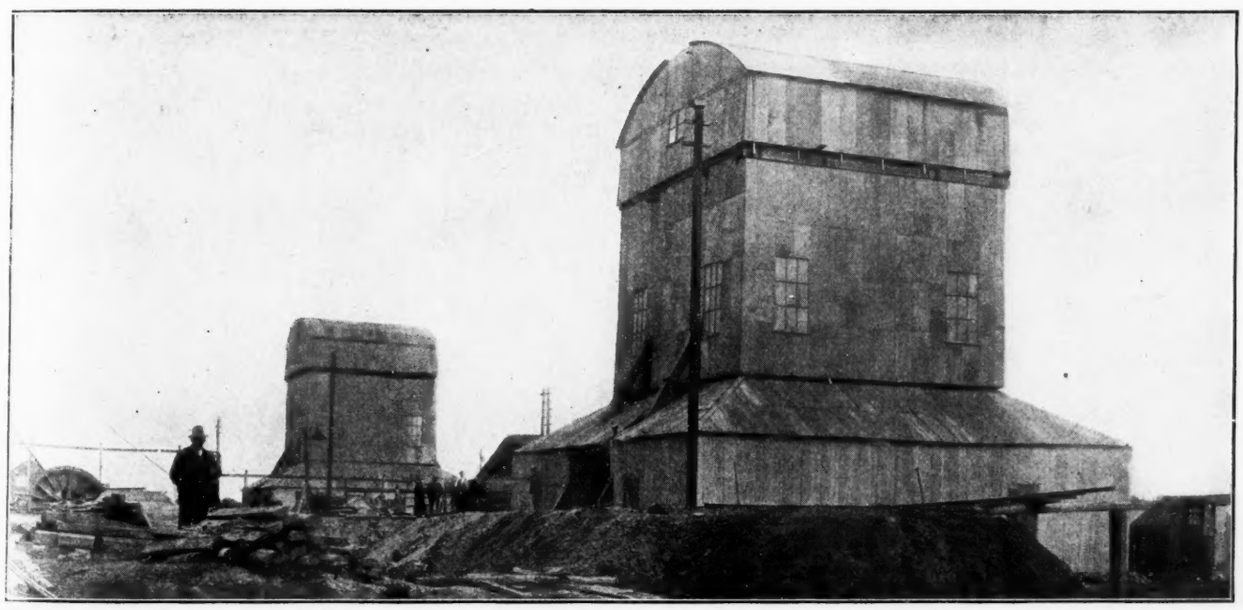
SYNOPSIS—Refrigeration has stabilized the world's food supply; it is now rendering not only possible the sinking of mine shafts through running ground, but permitting this process to be carried on with ease, safety and at a comparatively small cost. The wetter the strata traversed in the shaft sinking the more easily and efficiently can the freezing be accomplished.

There is a romance in fire. Prometheus stole it, the vestal virgins kept it burning on the sacred altar, and its flames kept alight the fire of religion and of faith among the people. But now fire is commonplace, and we seek romance anew in the modern and scientific process of refrigeration.

The real history of refrigeration began in 1879, when the steamship "Circassia," using the Bell Colman machine, carried the first cargo of frozen meat across the Atlantic. Scientists experimented for years, but only since the achievement of the "Circassia" has refrigeration become really practicable. At the present time the freezing machine is a thing as thoroughly understood as the steam engine, and the manufacturer will forecast what it will do to within a hairbreadth.

Quite ordinary in its appearance, the refrigeration machine is perhaps not so romantic or so popular in its appeal as a torpedo boat destroyer or an aëroplane; but in spite of that there lies in its application a whole world of hidden romance, and what is possibly better still—usefulness. It will peg away at cold storage, and it will entirely alter the trend of the world's trade and make the almost impossible quite feasible.

To begin with its ordinary uses. In the first place, as everyone knows, it has given us cold storage, which has regulated the food supply of the world. It might be compared to a flywheel that stores up energy when too much is generated and gives it out when too little is at hand. Thus cold storage accumulates food in the fat months and gives it up in the lean ones. It has almost tamed Mother Nature. Nature says: "I will give you apples in the autumn, and I will grow them for you in British Columbia. I will give you beef and mutton in abundance from the pampas of the Argentine, Australia and New Zealand." Man cries: "What shall I do? Mutton and beef will perish before the fastest ships can convey them across the seas. I want my apples in the spring, and I like my ice in the summer." Science steps in and says, "I will give you a freezing machine; with its aid food can be stored for a year and remain just as good as when the year started."



HEADFRAME OVER SHAFT BEING SUNK BY FREEZING METHOD

Bread, butter, eggs, hops, meat, milk, fruit, vegetables, have already eternal youth; even flowers can be retarded in growth or hastened into bloom by the aid of cold storage. Cold storage was once the principal task of a freezing machine, but now it is used almost as much for the manufacture of artificial ice. It will give you ice in any weather, store it for you until you want it and produce it as you like, opaque or so crystal clear you can read a paper through it two feet away. When you stand and look at an ice factory while coal goes in at one end and ice comes out at the other, you begin to wonder at the marvels of refrigeration.

The woman of fashion uses the refrigerator for her own ends. Her priceless silver foxes, her valuable sables, are

*Paper recently read before the National Association of Colliery Managers of Great Britain.

†Mining engineer, Llay, Gresford, North Wales.

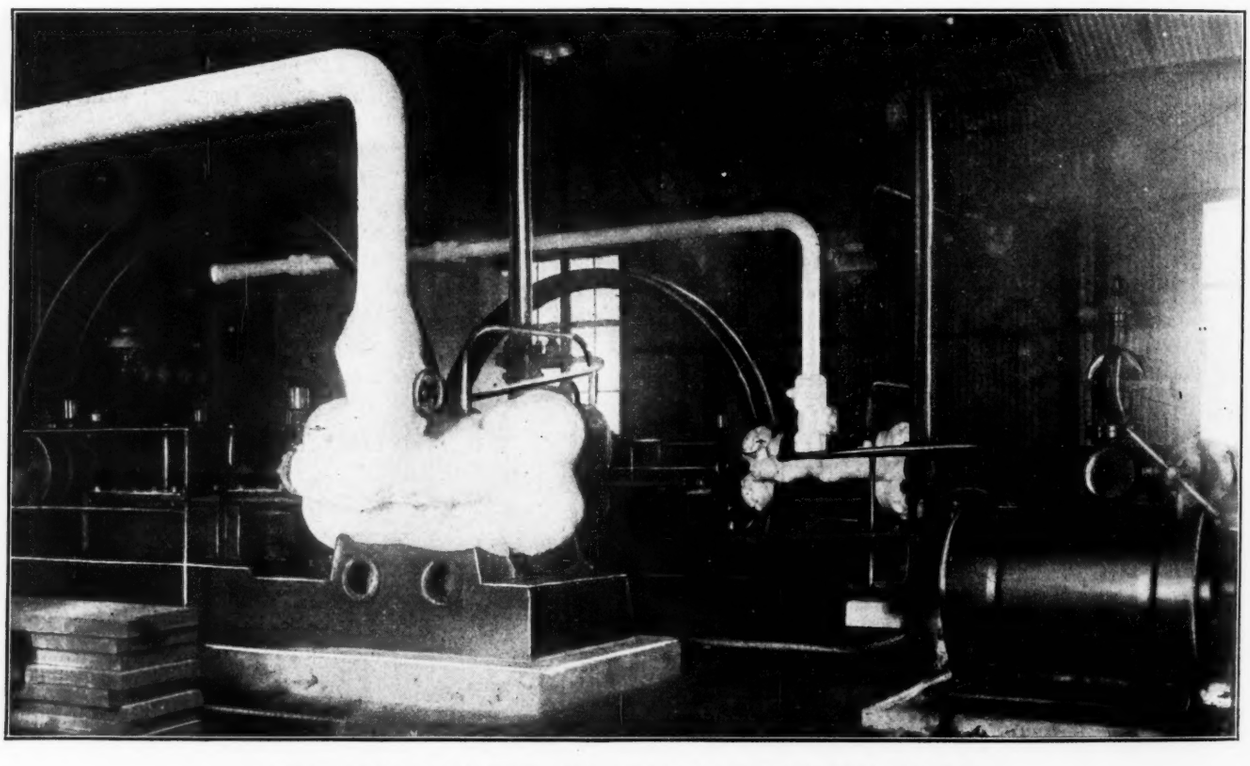
stored throughout the summer in big cold rooms where moths corrupt not. The society hostess wishes rare flowers at the wrong season, and cold storage comes to her aid. In the hospital, if a lengthy dissection is to be made, or a post mortem, the body is placed in cold storage till required. In the morgue of Paris bodies are kept for weeks to allow relatives the melancholy pleasure of identification. Ice rinks for pleasure are kept open all the summer.

Battleship magazines can be kept cool by this process, and cool air is used for feeding blast furnaces so as to get more heat from each pound of coal through freezing out the moisture in it; and the cost of steel production has thus been reduced. The freezing machine has rendered life bearable during the hot weather in all sorts of places, such as theaters in New York, Cologne and Buenos Aires, the Stock Exchange in New York and hotels all over the world.

The actual principle of the freezing machine is simple. It depends on the fact that when a liquid boils and turns into a vapor it abstracts heat from its surroundings. Hence, if the liquid is caused to boil inside of coils which are placed in the interior of a cold store, it will steal heat from the store and from the objects it contains—mutton or apples, air, etc. Thus both the store and its contents will become cold.

Therefore, all the machine has to do is to make a suitable liquid boil inside coils of piping. For this purpose a pump is required. This is invariably termed the compressor and sucks at the liquid, generally ammonia or carbon dioxide, and makes it boil freely and enter the pump or compressor as a vapor. It then discharges this vapor into a condenser, which converts it into a liquid, in which state it is squirted once more into the evaporator coils and used over and over again without any wastage. Refrigeration has entered into the mining world through its application to shaft sinking and has now established itself as one of the best methods of sinking a shaft through loose sand or water-bearing strata without the aid of pumps. Although it may prove to be more expensive than a pumping system, it can be counted on as being a certain success, whereas with the installation of pumps which are limited in their capacity the quantity of water may overcome the size of the plant. This necessitates an additional large expenditure, with no guarantee that the difficulty will be overcome. With the freezing machine and a carefully designed plant, ample power would be available for a complete and final success. In the olden days, when the shafts were sunk in firm water-bearing strata, if the water in these measures attained such volume that it could not be contended with the work was finished or, in other words, the shaft was lost.

The inventor of the freezing method for the sinking of shafts is F. H. Poetsch, who in 1883 introduced the process. He had not, however, worked entirely without precedent. In 1863, in South Wales, a small shaft was sunk by artificial cooling. In Siberia and also in Alaska, shafts are sunk by utilizing the intense cold of the climate, permitting the pit bottom to freeze, thawing it, and allowing the material excavated to be brought out to the surface. Shafts to a depth of even 80 ft. have been sunk in soft sand by this method.



TWO AMMONIA COMPRESSORS USED IN SINKING TWO SHAFTS

The object of freezing a shaft is to alter the condition of the soft or running ground. This, when in its natural condition, lacks a firm consistency and cannot be worked by hand. The binding together of loose particles may be brought about either by mechanical means or artificially, by refrigeration or, as referred to above, by natural temperatures such as exist in certain arctic regions.

In 1852, during a severe winter, it was observed that the water feeders in the Bonne-Part shaft at Anzin col-

liery in the north of France became frozen under the extreme temperature. In eastern Siberia the long and severe winters with their freedom from snowstorms and other warming influences have enabled the sinking of shafts to be brought to a fine degree of perfection. This is accomplished by the action of the frost on the shaft bottom, after which a fire is made of crossed logs, with a consequent thawing and excavation. This process is repeated, exposure to the frost alternating with thawing and excavation. Prospect shafts are thus sunk directly through the beds of rivers which cannot be diverted.

The first application of the freezing process in Great Britain, to which I have previously referred, was in south Wales, where it was necessary for a shaft to be put down through some inconsistent ground near the surface. An ether engine was supplied by Siebe Gormans, of London. This reduced the temperature of salt water, which was circulated through coils previously driven into the ground. By this method the cold was transmitted to the strata through which the sinking had to pass, and this attempt at sinking was considered quite successful under the circumstances.

It was not till 1883 that Poetsch's idea came forward as an improvement upon that practiced in south Wales. Since then a great many details have been vastly improved, but hardly has the principle been disturbed; other methods of shaft refrigeration have been proposed, but never adopted in practice.

Freezing Process Adaptable To All Measures

As a general rule, the freezing process for shaft sinking is applicable in all classes of rock. A great advantage in its favor in comparison with other shaft-sinking methods through difficult and water-bearing ground is that it is particularly suitable for inconsistent strata such as alluvial, tertiary and cretaceous grounds.

The best result is obtained from sand, which by this method is converted practically into sandstone. Again, in the case of red sandstone, such as that overlying the new coalfield of East Yorkshire, where excessive water feeders have been encountered in new sinkings, the freezing process has only to prevent the flow of water into the shaft. Here the large amount of water present insures an efficient ice wall and one that will be formed quickly.

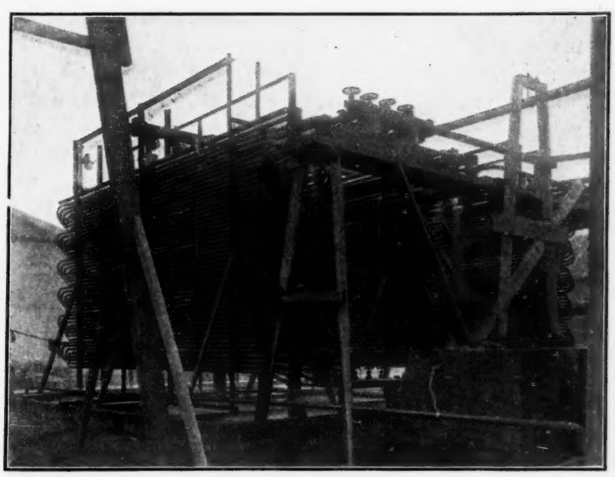
Clay presents a difficulty in freezing, owing to its elasticity and hardness, which require great care in lining the sides of a frozen shaft through this strata. It will be readily understood that strata which contain material acting as a bad conductor of heat will present a strong resistance to the influence of cooling. This is verified by the following experiments made at the Beeringen collieries in the Belgian Campine, at a depth of 900 ft. The temperature in frozen sand was —3 deg. to —6 deg. F.; clay +1.8 deg. to 0 deg. F.; lignite +10 deg. to +7 deg. Fahrenheit.

The freezing process as used for shaft sinking at the present time consists of two distinct component parts—namely, the freezing plant, which produces the low temperature, and the brine-circulation plant, which transmits the cold to the ground. These are entirely independent circuits, yet both work in parallel in the process. It is in these two circuits that various inventions have been proposed, chiefly to overcome a certain loss occurring in the cycle of refrigeration. These thermodynamic losses are superheating in the compressor and when passing through the regulating valve and the refrigerant leaving the condenser at a high temperature and entering the evaporator at a low temperature. To overcome this loss it was attempted to give direct expansion of the wet or liquefied gas to the freezing tubes. This was, however, without success.

Again, liquid air has been suggested, but its slow rate of evaporation prevents its utilization. All these ideas require gas-tight joints and are therefore not to be recommended, as the tubes being out of reach a leakage would not be noticed. Hence the gas circuit is confined to the surface plant only, and a medium is employed between the plant and the strata. This medium must be capable of standing low temperatures without freezing, and brine has proved to be the most serviceable.

The freezing point of sea water is slightly lower than that of pure water, and if more salts are added, the lower the freezing point becomes.

For making brine, sodium chloride (common salt) and calcium chloride are both extensively used, as well as magnesium chloride. All have their relative advantages. This salt solution, or brine, it must be clearly understood, is cooled in the refrigerator, which is really the evaporator, to many degrees below the ordinary point of freezing, so that whenever it comes in contact with any substance, be it liquid or solid, such as water in the



SURFACE AMMONIA CONDENSER

earth, or mutton or beef in the cold store, it will remove the heat contained in that substance and obviously reduce its temperature. Thus in the case of shaft freezing, the brine will carry off the heat from the wet strata and reduce its temperature; the operation being continuous, the strata eventually freezes and will remain in that condition as long as the brine is able to remove any heat. In fact, it will continue to remove heat and thereby extends the zone of frozen ground.

It must not be forgotten that there is a limit to the low temperature of brine; that is, brines will themselves freeze at a certain point. For example, calcium chloride ($CaCl_2$) brine, which is a common circulating medium for this class of work, is generally made up in 25 per cent. solution—that is, 44 deg. Tw., 26 deg. B., density 1.22. This will freeze at about —18 deg. F., but of course such a low temperature is seldom required.

To return to the brine, and the part it plays in the shaft freezing plant. The brine enters the evaporator tanks at the top. These tanks are cylinders about 10 ft. high and 5 ft. in diameter. A plant may consist of two or even four such tanks, each containing the ammonia gas circulating upward through coils of pipe laid horizontally. The brine here gives up the heat which has been extracted from the ground to the ammonia, thereby heating the ammonia and cooling the brine. For example, the brine enters these tanks at a temperature of —14 deg. C. and leaves it at a temperature of —16 deg. C., having been lowered in temperature 2 deg. C., this much heat being taken up by the ammonia in the coils referred to before. The brine then simply flows out of the tank at its base into a pump and is driven forward to what is termed the circular main, where it is divided into the various tubes that penetrate the ground, each tube being connected to this large feed pipe. The brine then flows down an inside tube to the full depth of the hole, but is prevented from going any deeper by the bottom end of the outer pipe, which is closed. Hence, there is a continuous circulation, and the brine reascends through the annular space outside the inner tube and inside the outer tube. These pipes are, as a general rule, of the following diameters: Outside or large freezing tube, 5 in., inside or inner freezing tube, 1½ inches.

The returning brine, which has now abstracted some of the heat from the strata traversed, is conducted into another circular main along with that from the remainder of the holes. Each hole is kept under full control by means of two valves, one on the inlet and one on the return side. This allows each or all the holes to be put out of circulation if necessary, or the flow to be increased or retarded as desired. The return brine is then led again to the evaporator tanks, to give up the heat it contains, whence it returns once more, as already described, and again flows down the tubes. It is thus seen that there is a continuous flow of brine to and from the tubes in the ground to the plant. This acts as a heat extractor from the ground, or as a cooling medium.

Brine Is Circulated in Adjacent Boreholes

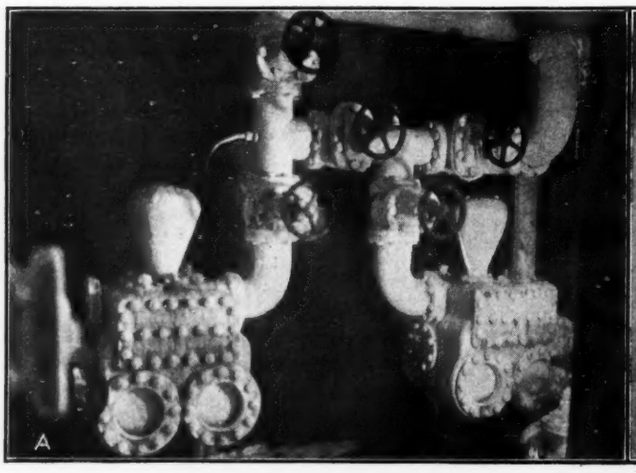
The tubes through which the brine circulates are placed in boreholes driven outside the area through which the shaft is to be sunk. They may number from 10 to 30 holes, depending on the circumference and depth of the shaft. The boreholes when sunk to full depth accommodate the special freezing tube, which has internal nipples or spacers, making a close, smooth fit on the internal tube. The outer tube terminates in a closed end at the bottom. All joints are tested to 200 lb. per sq.in. by hydraulic pressure, to insure that no leakage of brine will occur. The pipes must be made of the best mild steel. Any leakage of brine through a faulty pipe or connections would be disastrous to the freezing. To guard against this, a float is arranged so that any loss will immediately be observed. It can then be traced and prevented as far as possible.

It will readily be understood why great care has to be taken to prevent any loss of brine from the tubes, because the brine would then percolate into the ground and eat its way into the already formed ice wall, quickly thawing it and preventing any more freezing, since it would be exceedingly difficult to freeze ground containing brine. In such a case the work would be more or less lost. By exercising care and precaution, however, this can be avoided.

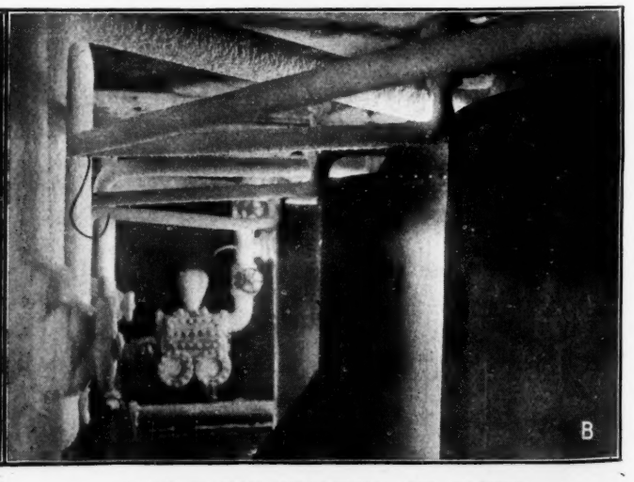
Another means of admitting brine into the ground is the liability of a pipe being broken or cracked by a heavy blast during the sinking, and in consequence shotfiring must be restricted to certain limits. Should a tube become broken and brine escape, such tube must be quickly replaced by a small set inserted inside the defective one. This means that for successful freezing, spare parts and duplicates must be on hand in case any sudden call should be made for them.

Anticipates Machine Breakdowns

It must be remembered that in shaft freezing it is highly important to confine the work of the machinery to the actual ground which is under treatment and to guard against any breakdown during the course of the sinking, in order that atmospheric influences shall not affect the temperature of the brine in the tubes and cause thawing to take place before the repairs are completed. Accordingly, all brine mains are insulated, the best protector being a good 3-in. hair-felt covering, amply protected from rain and sun, while the evaporators themselves, together with the brine pump, are placed in a specially constructed air-tight chamber built of three-ply wood with 6 in. of insulation between the walls. In the case of the compressor failing, the temperature of the brine would remain below zero for some days. Being isolated from the heat of the engine room, the ice wall in the



BRINE CIRCULATING PUMP



EVAPORATOR CHAMBER AND TANKS

shaft would not be affected, and a considerable amount of lost work would be saved.

The boreholes to carry the freezing tubes are placed around the pit outside the circle of the finished shaft and are generally from 2 to 3 ft. beyond the actual sinking size. These holes are generally spaced from 2 ft. 6 in. to 3 ft. 6 in. apart center to center. Each freezing tube forms a cylinder of frozen ground around itself, extending in diameter as the freezing is continued till each cylinder of frozen ground meets and joins with its neighbor. This then creates a closed wall, which upon further extension leaves a central unfrozen part in the middle of the shaft. In course of time this unfrozen part would itself become solid, were the process continued. Upon reaching the stage, however, when the sides are sufficiently frozen to be self-supporting, sinking can be commenced, thus avoiding the excavation of a frozen center, which would retard the progress of the operation.

Naturally, grounds containing much water will be more quickly frozen than those which are dry or comparatively so. Consequently, when passing through loose sand the entire shaft may be frozen, while in dry shale only the sides in the vicinity of the boreholes have been altered by the action of the frost, due to lack of moisture and low power of conductivity of the strata.

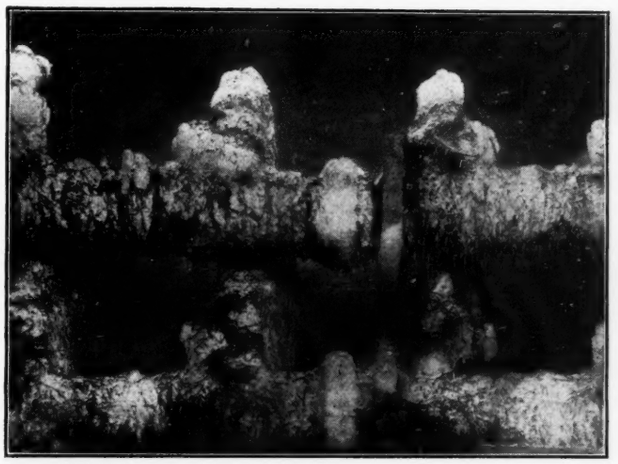
At the bottom of the holes there is a strong heat resistance to be overcome from the ground below, which does not contain any tubes. Consequently, the frozen zone at that point is thin, and here the center portion may not be frozen for a few feet, giving the frozen zone a shape resembling the bottom of a wine bottle. To guard against this, it is essential that the freezing tubes be placed deep enough to insure that this unfrozen center may be beyond the limits of the wet strata.

Importance of Correct Sinking of Boreholes

The formation of this frozen wall is based on each hole being as nearly vertical as possible, otherwise the influence of one hole toward another may not be complete, and a portion of the wall not be completely closed. It is not so important that the base of one freezing tube be not more than a specified distance from another, but that its position shall be such that the power of freezing may overcome the intervening space; also, if a tube penetrates toward the center of the shaft, it might be cut or damaged by blasting in the sinking, with the danger of loss of brine referred to before. Under these circumstances a new hole would be bored to supplant the one having excessive deviation. Generally speaking, the deviation permitted is ½ per cent. The deviation of boreholes and the means of ascertaining its amount is a subject beyond the scope of this paper, but an apparatus has been experimented with which will register the direction and amount of deviation of a borehole so accurately that the risk of unknown deviation is obviated.

The boreholes are put down by means of the ordinary percussive drill, mechanically operated. A good installation consists of three drills operating simultaneously. Excessive speed in boring is favorable to leading the hole out of the vertical. Consequently, drilling must be carried on at moderate speed. Casings are inserted in the holes until the full depth is reached, but after inserting the outer freezing tube this casing is removed.

All the freezing tubes may be recovered at the expiration of the work, after being thawed out. The holes may then be filled with concrete, or the tubes may be left in place if desired.



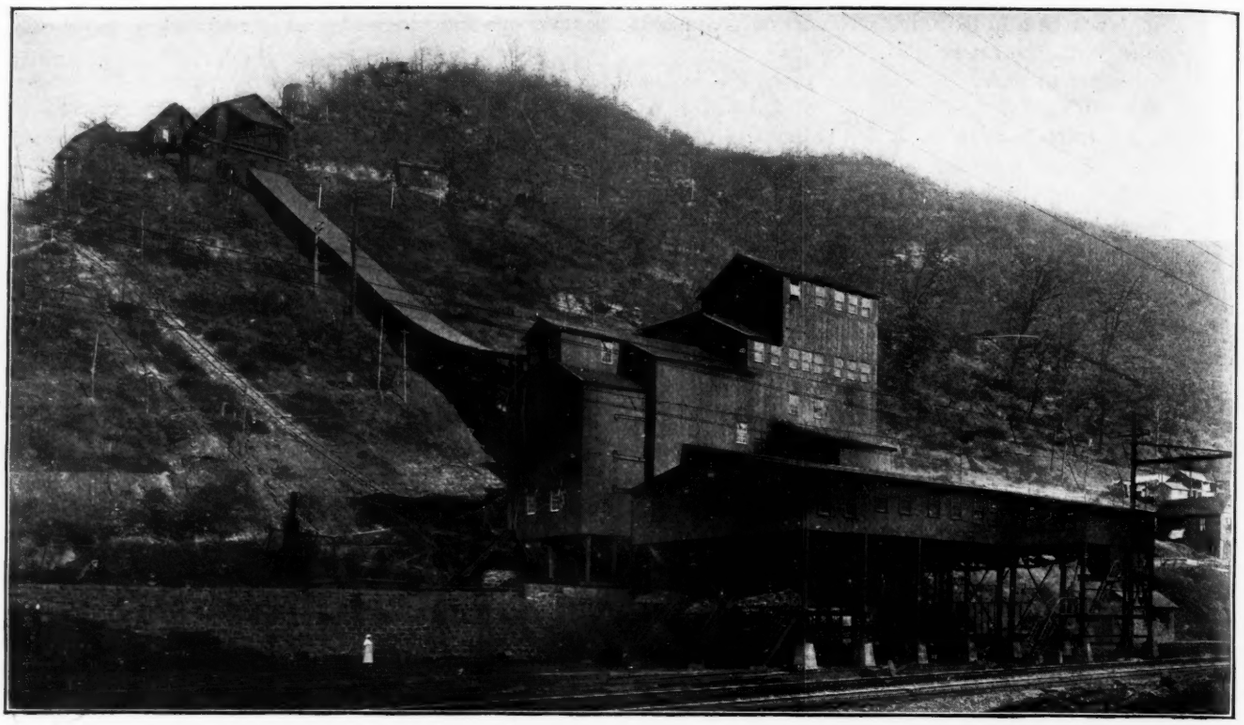
CIRCULAR MAIN IN FREEZING CELLAR

It does not always follow that where the freezing system has been adopted it is necessary to insert cast-iron lagging to secure the shaft. The freezing system only acts as a medium to enable the shaft to be sunk through bad ground, and in many cases brickwork lining can be put in which will withstand the work required. In the case of wet running sands this brick lining can be made almost water-tight by the cementation of the lining and the space immediately behind it. Where tubbing is used for a frozen shaft, the smooth-faced English system of tubbing with wood joints is far more satisfactory than bolted tubbing with metallic joints, which invariably show leakage after they have assumed their normal temperatures.

Actual sinking conditions in a frozen shaft are invariably conducive to good steady progress when it is assured that the ground has been brought to the state required. Of course, the explosives used must be of a nonfreezing type, and the charges should be proportioned with moderation and discretion. The ground should at all times be timbered in the usual manner, as the heat given off from a gang of men will act as a thawing influence on the sides of the shaft already sunk and may easily release a small pebble or piece of rock, which may fall on the men below. Ground which swells, such as clay, may contract the iron rings of the temporary lining so as to cause a shearing of bolts, but with proper attention this is easily avoided.

The cold temperature is not helpful to any idleness on the part of the men in the shaft bottom, and the general health of a sinker working in a frozen shaft is of the best. Working on a shaft bottom which is at all times visible is far superior to excavation done with the pit bottom covered with cold water, with the pump liable to fail at any moment.

Although shaft freezing has not always been a success, results in the past where failures have taken place have afforded experience which now places the system on such a sure footing that there is no reason to suppose that the limits of success are to be reckoned with. On the other hand, it is reasonable to believe that this method will be still further developed and will become the safest and one of the cheapest systems of shaft sinking where trouble is anticipated.



Tipple at Powhatan in Pocahontas Field

By Henry J. Edsall*

SYNOPSIS—Careful preparation of coal is essential to secure market advantages in normal times. The installation described is so designed that almost any combination of market sizes may be secured.

Until recent years little attention was given to the preparation of soft coal at the mines and, in most cases, is was simply taken out, loaded into cars by means of crude chutes and shipped as run-of-mine. With the increase of competition, however, and the more exacting demands of the trade, improvements in methods were inevitable.

At times like the present, when the demand for coal is great, improved methods are not an important factor; but in normal times, with keen competition and definite specifications are to be met, the company with an up-to-date tipple can not only handle and load the coal more economically, but by being able to prepare and size it carefully its selling advantages are greatly increased and the value of the coal is correspondingly enchanced.

The more progressive of the coal companies have been quick to take advantage of these possibilities, and the result has been a constant improvement in the design and construction of tipples; and, with broader experience, greater possibilities of perfection have developed, so that some of the later designs are remarkably comprehensive in general arrangement and show great perfection in detail.

One of the latest and most complete tipples is that recently built for the Powhatan Coal and Coke Co., at Powhatan, W. Va. This company started mining operations in 1889, working the No. 3 Pocahontas seam of coal. Its lease is located in the heart of the famous Pocahontas coal region, and originally contained about 958 acres of the No. 3 seam. The Norfolk & Western Ry. runs through the property, and the coal bed is located about 324 ft. above the railroad tracks.

The mining is carried on by the double-entry panel system, with two main drift openings. Electricity is used for handling the mine cars and for operating the tipple machinery. About 400 men are employed at the plant, and in 1916 over 285,000 tons of coal were shipped.

When this company started to build a new tipple the directors took a broad view of the matter and decided to build it right, even though the first cost might be higher. They considered that greater advantages and low maintenance were of more importance than low first cost, and that the additional money that might be needed to make it complete and first class in every detail would undoubtedly insure a good rate of return on the investment.

The design was therefore worked up and the contract placed without resorting to competitive bids, which nearly always results in a design and construction which is cheaper in first cost than would be obtained by following the best practice, because the best is apt to be too expensive for success in competitive bidding. The contract was placed in November, 1915, and the tipple was put into operation in October, 1916. After running for about six months, it has more than come up to expectations in smoothness of operation, in comprehensiveness of arrangements and in perfection of design and construction.

By referring to Fig. 1 it will be seen that the tipple is really divided into two parts, a low building over the loading tracks for the picking tables and part of the

*Philadelphia, Penn.

conveyor system and a high one a little to one side that contains the pea, slack and refuse bins, the rotary screen for separating the pea and slack, and the V-bucket machine for handling these sizes.

The two main buildings are connected by an intermediate structure, which spans one of the loading tracks and a space adjoining. The upper shaking screen extends across the intermediate building and delivers over the end to the lower shaking screen located over the rear end of the picking tables. There are five loading tracks under the picking table and intermediate building and two coke-larry tracks under the pea-and-slack building for the larries from the coke ovens.

The coal is brought into the building by means of a retarding conveyor, of the double-strand flight type, which has a capacity of 450 tons per hour. This conveyor extends through the pea-and-slack building and delivers over the end to a chute to the upper shaking screen. Just above the end of the conveyor the trough is replaced by a bar screen with $\frac{3}{8}$-in. openings between the bars. The object of this screen is to take out some of the slack so as to relieve the shaking screens of part of this work and thereby increase the effectiveness of the screening. The slack that passes through this bar screen goes into a hopper underneath, from which it is fed to the gravity discharge machine.

When the slack is not to be removed from the coal, but the entire output shipped as picked run-of-mine or other mixtures that include the slack, the valve in the bottom of the hopper is left closed so that the hopper fills up and the slack passes over the screen.

At the lower end of the retarding conveyor there is a chute to the upper shaking screen. In the bottom of this chute is a gate which, when open, allows the coal to go through into a six-ton hopper or bin for emergency run-of-mine, when this coal is to be loaded without passing it over the shaking screens and picking tables. A chute of special design to minimize breakage leads from the hopper to the cars.

The upper shaking screen is 8 ft. wide by 28 ft. 9 in. long. The screen part is 16 ft. long and contains $\frac{1}{2}$ x $\frac{3}{4}$-in. perforations to take out pea and slack. Underneath this shaking screen is the pea and slack gathering hopper, with a chute leading to the cross slack conveyor No. 9. This cross slack conveyor takes the pea and slack over to the mixing conveyor, when it is to be put back with some of the coal that is being loaded, or, if the cross slack conveyor is reversed, the pea and slack is taken over to conveyor No. 10, which conveys it to the V-bucket machine, in the pea-and-slack building.

The coal which passes over the upper shaking screen moves on to the lower one, which is 8 ft. wide by 29 ft. 3 in. long. In the upper part of this screen there is an 8-ft. section of lip screen with $1\frac{1}{4}$ x $1\frac{1}{2}$-in. holes, through which the nut size passes to the gathering hopper underneath and then to the nut picking table. In the lower part of this screen is another 6-ft. section of lip screen for taking out the egg, the holes in this case being 3 x $3\frac{1}{2}$ x 8 in. The egg size that goes through these holes is delivered to the egg picking table.

In both the egg and nut gathering hoppers under the lower shaking screen there are 2-ft. sections of rescreening plates with small openings for cleaning the egg and nut coal still more carefully by taking out any slack and pea coal, which they may still contain, just before they go onto the picking tables. This pea and slack coal goes

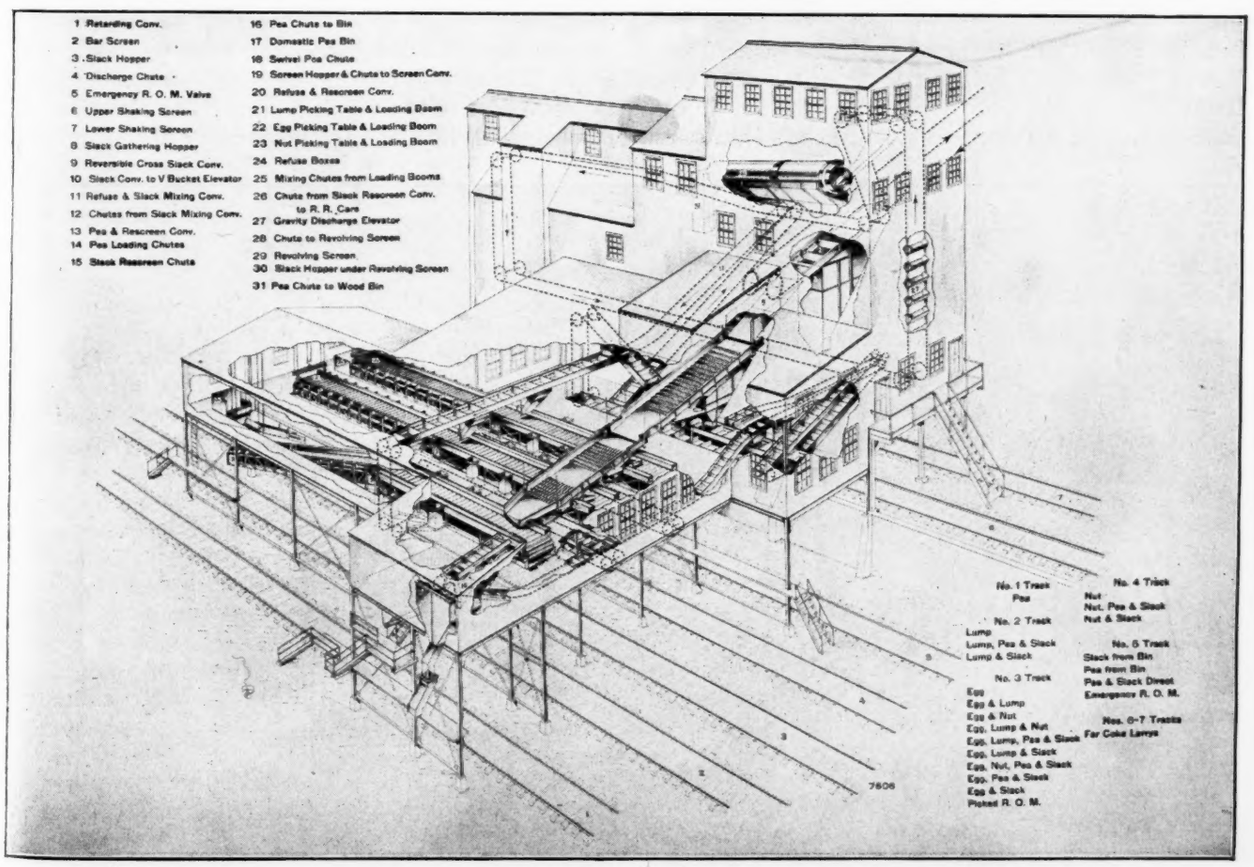

1 Retarding Conv.
2 Bar Screen
3 Slack Hopper
4 Discharge Chute
5 Emergency R. O. M. Valve
6 Upper Shaking Screen
7 Lower Shaking Screen
8 Slack Gathering Hopper
9 Reversible Cross Slack Conv.
10 Slack Conv. to V Bucket Elevator
11 Refuse & Slack Mixing Conv.
12 Chutes from Slack Mixing Conv.
13 Pea & Rescreen Conv.
14 Pea Loading Chutes
15 Slack Rescreen Chute
16 Pea Chute to Bin
17 Domestic Pea Bin
18 Swivel Pea Chute
19 Screen Hopper & Chute to Screen Conv.
20 Refuse & Rescreen Conv.
21 Lump Picking Table & Loading Boom
22 Egg Picking Table & Loading Boom
23 Nut Picking Table & Loading Boom
24 Refuse Boxes
25 Mixing Chutes from Loading Booms
26 Chute from Slack Rescreen Conv. to R. R. Cars
27 Gravity Discharge Elevator
28 Chute to Revolving Screen
29 Revolving Screen
30 Slack Hopper under Revolving Screen
31 Pea Chute to Wood Bin
No. 1 Track
Pea
No. 2 Track
Lump
Lump, Pea & Slack
Lump & Slack
No. 3 Track
Egg
Egg & Lump
Egg & Nut
Egg, Lump & Nut
Egg, Lump, Pea & Slack
Egg, Lump & Slack
Egg, Nut, Pea & Slack
Egg, Pea & Slack
Egg & Slack
Picked R. O. M.
No. 4 Track
Nut
Nut, Pea & Slack
Nut & Slack
No. 5 Track
Slack from Bin
Pea from Bin
Pea & Slack Direct
Emergency R. O. M.
Nos. 6-7 Tracks
For Coke Larrys
7606

FIG. 1. GENERAL ARRANGEMENT OF MACHINERY

first to conveyor No. 20 and then to the rescreen conveyor No. 13, for delivery either to the cross slack conveyor No. 9, or, at the end, to a small hopper for loading to cars on track No. 5.

In the picking-table building are the three picking tables for lump, egg and nut. The egg and nut tables are 5 ft. wide and the lump table 4 ft. wide. Each table has a horizontal part where the picking is done which is 29 ft. long from the center of the driving shaft to the hinge of the loading boom. This is succeeded by a loading boom section 37 ft. in length, which can be lowered into railroad cars, so that the coal can be deposited with a minimum amount of drop and, therefore, a minimum of breakage.

Room for Eighteen Slate Pickers at Tables

There is room for at least six pickers at each table. These pickers remove the bone, slate and other refuse from the coal and drop it down conveniently located chutes leading to the refuse conveyors, which take it over and deliver it to conveyor No. 11, which conveys it to the refuse bin in the pea and slack building. From this bin it can be discharged into rock cars on tracks just beyond the larry tracks.

To go back to the pea and slack, it was previously stated that these sizes could be delivered to the V-bucket machine from conveyor No. 10. The V-buckets elevate this coal and discharge it over a chute to a rotary screen, the screening part of which is composed of wire cloth with $\frac{3}{8}$-in. square openings. After the slack goes through the screen, it is again discharged to the V-buckets, which travel underneath the screen. The buckets then take it over and discharge it into a 350-ton slack bin.

If desired, it can be delivered to the upper run of the mixing conveyor instead of to the bin, by means of a rack and pinion gate in the conveyor trough. It may then be deposited on the lump, egg or nut loading booms at the hinge points, when it is desired to mix it with these sizes. The pea size goes over the end of the screen into a bin of 150 tons capacity. The slack coal can be drawn off from the slack bin into railroad cars on track No. 5 or into the larry cars on tracks Nos. 6 and 7, to go to the coke ovens.

The pea can be loaded into railroad cars on track No. 5 or reclaimed by the V-buckets from the bin and delivered to the upper run of the pea and rescreen conveyor No. 13, which discharges it at the far end over a chute to railroad cars on track No. 1, or to a five-ton pea-coal bin for domestic purposes, this bin being equipped with a swivel chute for loading to wagons. The chute to the cars has a rescreen plate in the bottom to remove small coal and deliver it to the rescreen conveyor.

The loading of the various sizes on the different tracks is accomplished as follows:

Lump—From lump loading boom direct to cars on track No. 2. From lump loading boom, in raised position, over chute to cars on track No. 3.
Egg—From egg loading boom direct to cars on track No. 3.
Nut—From nut loading boom direct to cars on track No. 4. From nut loading boom, in raised position, over chute to cars on track No. 3.
Pea—From end of conveyor No. 13 to cars on track No. 1. From pea bin over chute to cars on track No. 5.
Slack—From slack bin over chute to cars on track No. 5. From slack bin over chute to larries on tracks Nos. 6 and 7. From mixing conveyor No. 11 to lump, egg or nut loading booms and thence to cars on tracks No. 2, 3 or 4.
Pea and Slack—From gathering hopper under upper shaking screen. From mixing conveyor No. 11 to lump, egg or nut loading boom and thence to cars on tracks No. 2, 3 or 4. From gathering hopper, under shaking screen, through gate in conveyor No. 9 and over chute to cars on track No. 5.

By using the above operations in different ways, the separate sizes and combinations can be loaded on the several tracks as follows:

No. 1 Track—Pea.
No. 2 Track—Lump; lump, pea and slack; lump and slack.
No. 3 Track—Egg; egg and nut; egg and lump; egg, lump and nut; egg, lump, pea and slack; egg, lump and slack; egg, nut, pea and slack; egg, pea and slack; egg and slack; picked run-of-mine.
No. 4 Track—Nut; nut, pea and slack; nut and slack.
No. 5 Track—Slack from bin; pea from bin; pea and slack direct; emergency run-of-mine.
Nos. 6 and 7 Tracks—For coke larries.

The picking-table building and the intermediate building are of steel construction, covered with corrugated ingot iron. The columns are of the Bethlehem H type, and the floor-beams are 12-in. channels, with angle, channel and I-beam braces and struts. The roof is of No. 10 corrugated ingot iron, and the sides are covered with No. 22 gage material of the same type.

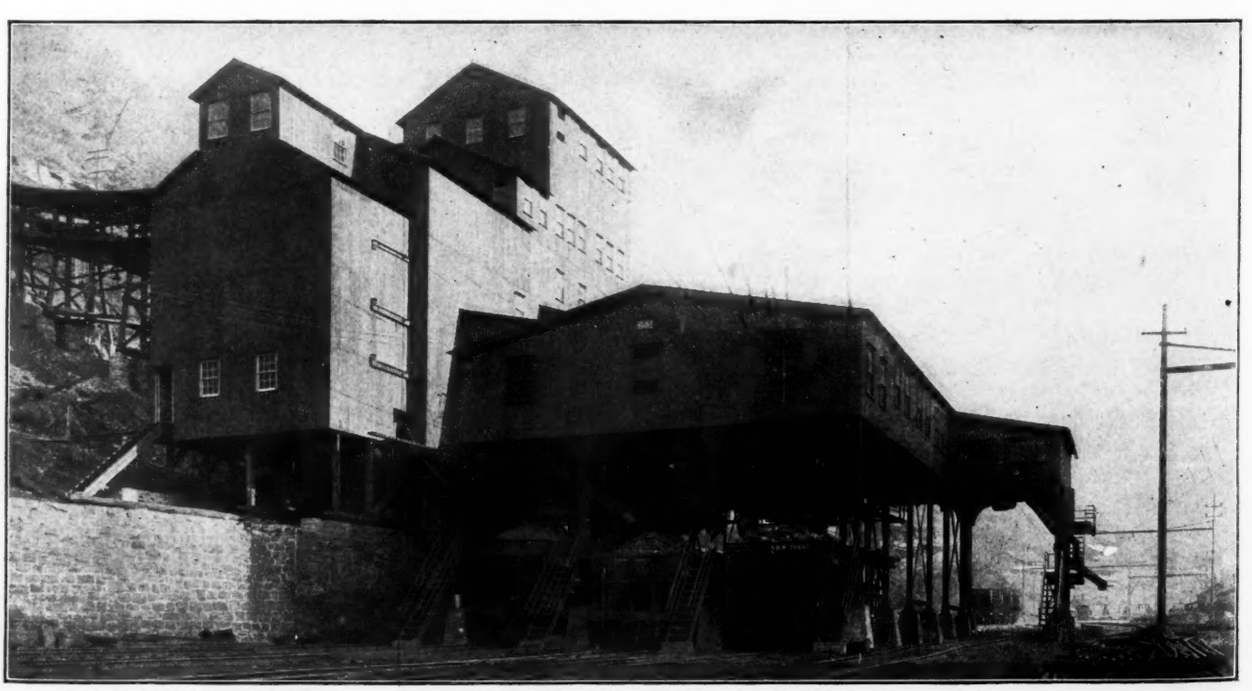


FIG. 2. NEAR VIEW OF TIPPLE FROM LOWER SIDE

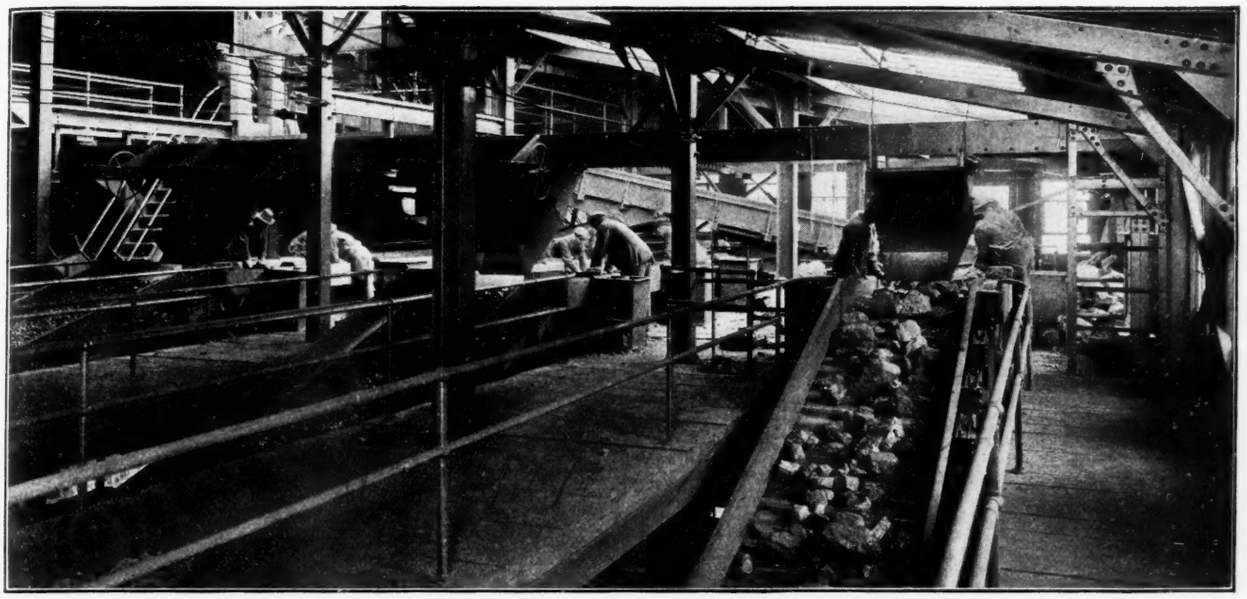


FIG. 3. COMBINED PICKING TABLES AND LOADING BOOMS

A generous supply of light is obtained by a large number of windows around the sides of the building, and the picking tables receive additional light from a Lupton skylight. The pea-and-slack building is covered with corrugated ingot iron, and the machinery there housed is well lighted from the windows in the sides and ends.

The shaking screens are of the double, balanced type and suspended from four hanger rods, with turnbuckles for adjusting the angle of inclination. They are operated by ball-and-socket eccentrics, which are self-aligning and driven at a speed of 100 r.p.m. The first shaking screen takes out the pea and slack, which goes into the gathering hopper underneath, and then into the cross slack conveyor. The lower shaking screen removes the nut and egg, which are delivered, by means of hoppers and chutes underneath, to the nut and egg picking tables. The lump coal that passes over the screen openings goes over the end of the screen to the lump picking table.

As stated previously the egg and nut picking tables are both 5 ft. wide, and the lump table is 4 ft. wide. These picking tables are constructed of $\frac{3}{16}$-in. corrugated steel pans, attached to a double strand of 9-in. pitch, steel-bushed strap chain, with through rods every 3 ft., to act as spacers and to tie the chains together efficiently. At the chain joints there are $3\frac{1}{4}$-in. rollers, which travel on steel angle tracks on both the carrying and return runs.

Steel channel guards are placed along the tables on each side, where the pickers stand. The chains are further protected by side guards to keep the coal from getting on them and to make it safer for the pickers. The channel sides also serve as a table on which the refuse can be separated from the coal with picks.

Steel refuse chutes, by means of which the refuse is delivered to the refuse conveyors, are placed at convenient intervals along the picking tables. Each picking table and loading boom is a continuous machine, so that there is no transfer of the coal, the loading-boom end being constructed so that it can be raised and lowered. This operation is accomplished by means of an electric hoist, the hoisting rope being attached to a bale at the end of the loading boom. These electric hoists make it possible to raise and lower the booms easily and quickly. Ordinarily each boom is lowered into a car when coal is being handled over it, but, as previously described, the outside booms are sometimes used in the raised position, when it is desired to deliver the coal into chutes, which lead from the booms to cars on track No. 3, so that certain mixing operations can be accomplished in this way.

Conveyors Nos. 9, 10 and 11—namely the reversible cross slack conveyor, the slack conveyor to V-bucket elevator and the refuse and mixing conveyors—are all constructed with a double strand of 12-in. pitch, steel-bushed, steel strap chain, with 36 x 12 x $\frac{3}{8}$-in. steel flights every 3 ft. The trough bottoms are of $\frac{1}{4}$-in. steel plate, and the sides of the trough are plates and shapes. The chains have $3\frac{1}{4}$-in. rollers at the joints, and these rollers travel on steel angle track on both the carrying and return runs, so that the flights are supported slightly above the troughs along which they push the coal. The power required is thus reduced to a minimum. The speed of these conveyors is 100 ft. per min., and at this speed they can handle 250 tons of coal per hour.

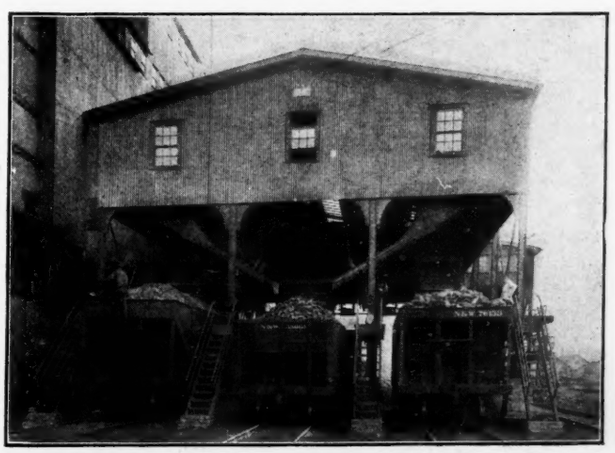


FIG. 4. LOADED CARS UNDER TIPPLE

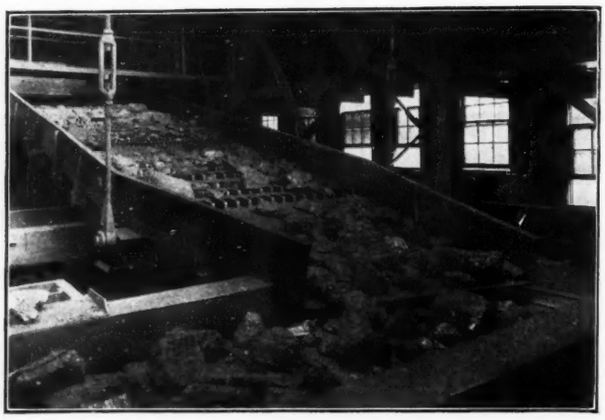


FIG. 6. DISCHARGE END OF SHAKING SCREEN

Conveyor No. 13, the pea and rescreen conveyor, is of similar design to the ones just described except that the flights are smaller, the size in this case being 20 x 8 x ¼ in. These flights are spaced at intervals of 3 feet.

Conveyors No. 20, the refuse and rescreen conveyors, are of the same size and construction as conveyor No. 13, except that in this case the flights are spaced at intervals of 4 ft. instead of 3 feet.

V-Bucket Machine Is of Heavy Construction

Conveyor No. 27, the gravity discharge elevator, or V-bucket machine, is made up of a double strand of 18-in. pitch, steel bushed, steel strap chain, with 5-in. inclosed oiling rollers at the joints. The buckets are 48 in. long by 24 in. wide by 16 in. deep, spaced every 36 in. They are made of ¼-in. steel plate and have a reinforcement of 2 x ½-in. ovals around the top edge. On vertical runs the rollers of the chains travel between double guides, and the coal is carried up in the elevator buckets.

On the horizontal and inclined runs the chain rollers travel on steel tracks, and the buckets serve in a similar manner to the flights of a flight conveyor—namely, to push the coal along in the trough, which is of ¼-in. steel plate.

This machine runs at a speed of 100 ft. per min. and has a capacity of 250 tons of coal per hour.

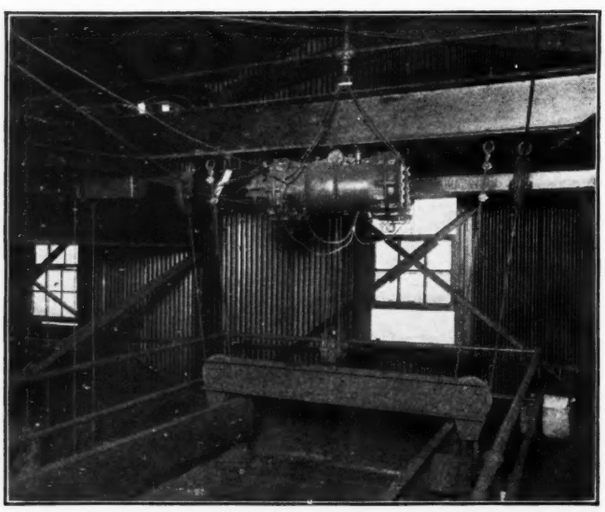


FIG. 7. ELECTRIC HOIST ATTACHED TO END OF LOADING BOOM

The revolving screen is 5 ft. in diameter and 24 ft. long. It revolves at a speed of about 12 r.p.m. There is a 3-ft. section of dead plate at the receiving end and a 6-ft. section of dead plate at the discharge end. Between these dead plates is the screening section, made up of No. 8 gage wire, with ⅜-in. clear openings.

The longitudinals of the screen frame are made of double 5 x 3 x ⅜-in. angles riveted back to back. There is also an intermediate ring at the center, 12 in. wide, with three 1¼-in. reinforcing rods. The screen is mounted on two cast-steel rings, one of which has a bevel surface to engage with a thrust roller, and the friction rings ride one, and are revolved by, two pairs of 22 x 5-in. chilled face rollers.

The motors for operating the machinery are as follows:

One 125-hp. motor, for the V-bucket machine and revolving screen.
One 60-hp. motor for the shaking screens, cross slack conveyor and conveyor to V-bucket machine.
One 50-hp. motor for the picking tables and the pea and rescreen conveyor and the two refuse and rescreen conveyors.
One 30-hp. motor for the refuse and mixing conveyor.

The driving machinery includes clutches, so that any unit can be cut out at will. Walkways and stairways

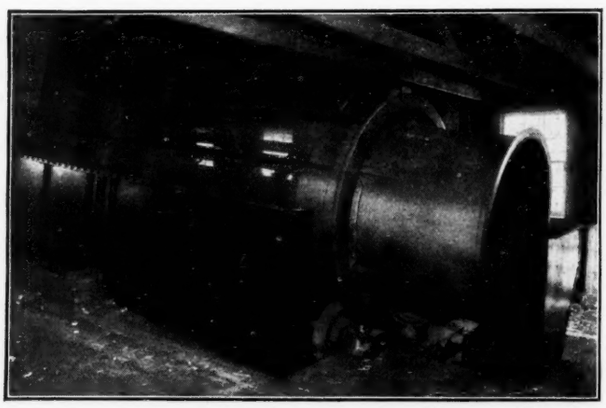


FIG. 8. THE REVOLVING COAL SCREEN

are provided for access to all parts of the equipment, and these all have clear headroom, to avoid injury to the attendants.

Meeting of the Rocky Mountain Coal Mining Institute

The summer meeting of the Rocky Mountain Coal Mining Institute will be held in Glenwood Springs, Colorado, at the Hotel Colorado, beginning June 19, 1917, and continuing for three days.

Thomas Gibson will read a paper on "What the Union Pacific Coal Co. of Wyoming Is Doing for Safety First." R. M. Hosea will talk on "The By-Product Oven and Its Relation to National Preparedness." Floyd W. Parsons, editor of *Coal Age*, will present his paper on "The War and the Coal-Mining Industry," and Parson Simpkins, of Salt Lake City, will have as his subject "The Miners' Contribution to the Country in War Time."

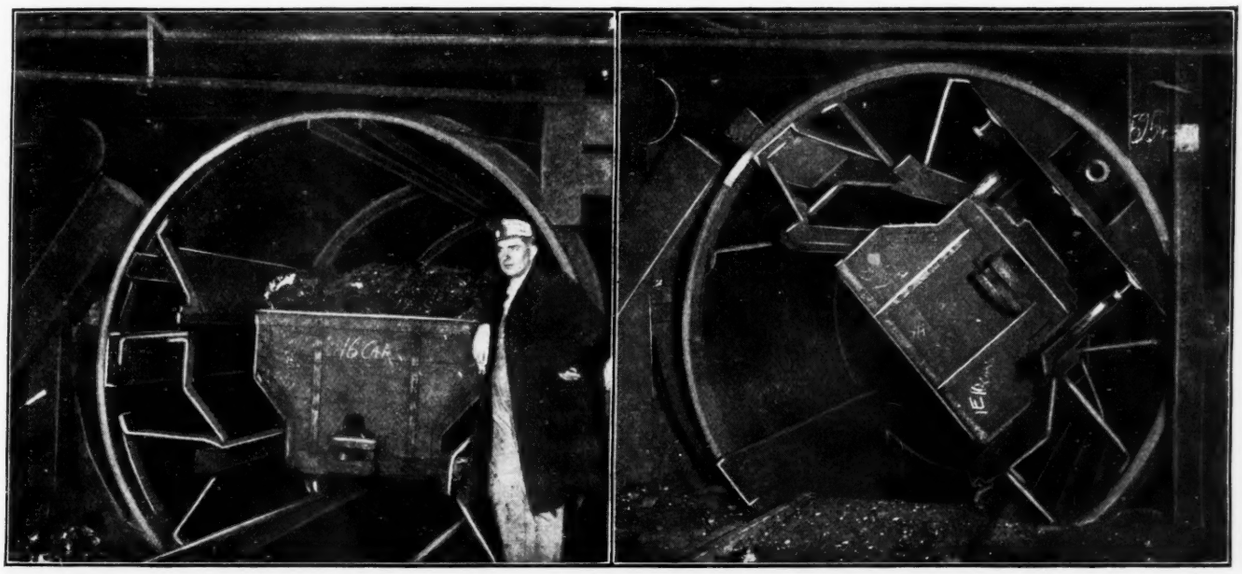
It is probable that a Government official or a member of the Committee on Coal Production of the Council of National Defense will talk on the work of the Fuel Board and the importance of coal mines to the production of war necessities.

Rotary Dump Installed Underground

By E. L. Berger*

SYNOPSIS—The substitution of a rotary dump for a dumping track underground resulted in the saving of much time and labor. The dump, together with its driving mechanism, was installed complete without the loss of a single working day.

At the Zeigler mine, Zeigler, Ill., the coal is hoisted in skips which have a capacity of 8 tons, the shaft being too small to accommodate the mine cars. The skips are loaded from a hopper that has a capacity of 40 tons, and the hopper is built below the level of the coal and adjacent to the hoisting shaft. Originally, a single track passed directly over this hopper, and as the loaded cars traversed it the dogs holding the car doors in place were loosened by hand, the coal falling through the bottom of the car into the hopper. Much trouble was experienced because frequently the coal would arch in the cars and fail to drop through until it was started by bars. The doors would sometimes come loose while the car was on the way from the working face to the bottom, and considerable coal would drop onto the roadways, making them very dirty and necessitating frequent road cleaning.



FIGS. 1 AND 2. DUMP AND CARS IN NORMAL AND DUMPING POSITION

To overcome the delay and trouble caused by these conditions a Wood's rotary dump was installed directly over the hopper. The illustrations show most of the essential features of this dump.

Three 90-lb. steel rails, each bent into the form of a circle with the ball of the rail out, are placed respectively at the center and near the ends of the dump.

Two 6-in. channels, each bent in the form of a circle with the flanges extending outward, are adjacent to the two circular 90-lb. rails at the ends of the dump. The inside diameter of all the circular parts is 9 ft. These various circles are connected and held together by ties of angle iron, channels, and the track of 90-lb. rail, extending the full length of the dump, which is 27 ft. 6 in.

The ball of each 90-lb. circular rail rests on the tread of two 18-in. roller-bearing car wheels, making in all six car wheels, which support the dump. In Fig. 2 may be seen parts of the two wheels on one end of the dump.

The dump stands on a grade of 2 per cent. The flanges of the wheels at the lower end and at the center are on the side of the wheel toward the low end of the dump. The wheels at the upper end are turned in the opposite direction. When the dump turns, the 90-lb. circular rails travel on the tread of the car wheels, these wheels meanwhile revolving in their stationary bearings.

The circular 6-in. channels at each end of the dump form a drum somewhat similar to that of a hoisting engine, around which is wound a flexible wire rope. Three turns of this rope are taken on each drum. The rope then passes around the necessary sheaves and is connected to the pistons of two air cylinders, each 11 ft. 6 in. in length and respectively 12 in. and 10 in. in diameter. The 12-in. air cylinder is used to turn the loads over and the 10-in. cylinder, in connection with a counterweight, to bring the dump back to an upright position. An air pressure of 80 lb. per sq.in. is used to operate the dump.

In practice two loaded cars are placed in the dump and air admitted to the 12-in. cylinder. As the piston of this cylinder moves, it pulls the rope and revolves the dump. The air is then released from the 12-in. cylinder and admitted to the 10-in. cylinder which, with the counterweight, brings the dump back into position ready to receive two more loaded cars.

The dump does not make a complete revolution, but turns 135 deg., which is sufficient to empty all the coal from the cars. When the cars enter the dump, the wheels pass under an angle which just clears their tops. These angle irons over the wheels and the guides which just clear the sides of the cars near their tops hold the cars in position while the dump revolves. The illustrations show both the angles and the guides.

*Bell & Zoller Mining Co., Ziegler, Ill.

Cars entering the dump are prevented from going on through by a set of horns near the lower end of the dump (not visible in the illustrations). After the dump turns and comes back into position, these horns open, but close again as soon as the two empty cars pass by them.

Fig. 1 shows the loaded cars in the dump ready to be turned over, and Fig. 2 shows the cars just after dumping and before turning the dump back.

The operator's platform is to the left of the dump. The dump has a capacity of six cars, or approximately 25 tons of coal per minute, including the time necessary to get the empties off and the loads on. The loads coming on bump the empties off, the cars going in at one end of the dump and out at the other.

The machinery was installed without the loss of a single working day. Supports, air cylinders, bearing wheels and all timber which would not interfere with the operation of the mine were installed at night. The remaining work was then done on Sunday, Dec. 31, 1916, and on Monday, Jan. 1, 1917, this being a legal holiday. The dump has been in operation since that time and gives no trouble. It makes possible the use of a tight car without any doors whatever, thus eliminating the leakage of fine coal along the roadways and making possible the use of a car which can be thoroughly braced. Its use furthermore has increased the speed of coal handling at the shaft bottom.

Previous to the installation of this dump the largest output that the mine produced in 8 hours was 4605 tons; since its installation, this record has been broken a number of times, the largest tonnage for any one day having been 5254, which is the record for Franklin County mines.

This dump was furnished by the Wood Equipment Co., McCormick Building, Chicago, Illinois.

Burning Coal Beds of the West

Many coal beds in the great coal fields of the Western States have at some time taken fire and burned along their outcrops, baking and reddening the overlying strata so that they have become a kind of natural brick or terra cotta. The fires were in places hot enough to fuse and recrystallize the overlying shale and sandstone so as to form natural slag. At some places this slag resembles true igneous rock; at others it consists largely of rare minerals. Thoroughly fused slag seems to occur chiefly in the crevices or chimneys through which the hot gases generated in the burning escaped through the overlying strata to the surface. The chimney-shaped masses of slag are harder than the surrounding baked rock and, after that has weathered away, form the curious pinnacles that surmount many clinker bluffs or buttes in the West.

Some of the coal beds, especially those exposed on the higher hills, were perhaps ignited by lightning; others, according to well-authenticated reports, were ignited by prairie fires or camp fires; but as burning on the outcrop has been so common as to affect most of the coal beds in an area of more than 200,000 square miles, much of it has probably been due to spontaneous combustion.

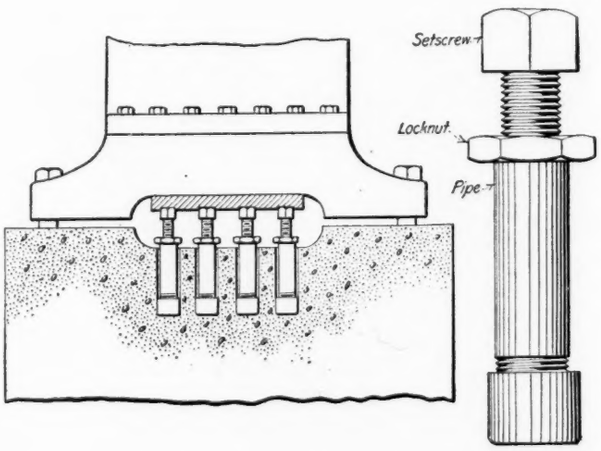
Coal beds are now burning at or near the surface at many places in the West, where the burning of the bed is disclosed by the smoke and fumes that rise from it and by the heat at the surface of the earth near the outcrop or above the bed—heat so intense that it kills all vegetation. As the coal burns out the overlying rock or earth generally caves in so as to form large fissures in the ground. As the burning works back from the outcrop, the heat acts on the overlying rocks, but finally combustion is smothered for the lack of oxygen.

A brief account by G. S. Rogers of the burning of coal beds in place, with a discussion of the causes and a petrologic and chemical description of some of the baked and fused rock formed, has been published by the United States Geological Survey as Professional Paper 108-A. A copy of this report may be obtained free on application to the Director of the Survey.

Ingenious Home-Made Jack

One of the many disagreeable jobs met with in mill work is lining up heavy machinery, and even where tools and experienced helpers are plentiful, work of this kind is not without its troubles; but in the small plant, where the largest hoist is likely to be too small, there is good cause for some apprehension on the part of the engineer in charge of such a job. A. D. Palmer describes in *Power* the interesting method by which he solved this difficulty.

While working in a general repair shop, he was sent out to put a small plant in working condition. One of



USING SET SCREWS AS IMPROVISED JACK

the machines geared through a countershaft to the mainshaft had settled so badly that the teeth of the gears were only touching at the corners. Mr. Palmer had no heavy jacks or chain blocks, and as he had only one young fellow with him, the job appeared to be beyond his powers. However, while going ahead with the rest of the work, he hit upon the following idea.

He had noticed some large hangers in the basement, and from these he took the setscrews that were used to keep the box in place. These screws were fitted with locknuts, and the threaded portion of the screw just fitted inside a 1-in. pipe. This could be used as a jack by holding the head of the screw and turning on the nut.

Holes were drilled in the cement under the machine, and a plate, with holes countersunk to receive the heads of the screws, was placed between the machine base and the jacks. When the jacks were in position, it was an easy job to lift the machine to its proper level.

War Sidelights

Under this heading in Coal Age each week we hope to publish items relating to war measures as they affect the coal-mining industry. We earnestly invite all our readers to send us interesting notes covering happenings which bear on the war, either in a military or an industrial way.—Editor.

Stephen Peta, 30 years old, was shot and badly wounded at the Colbert colliery, operated by the Shipman Coal Co., Shamokin, Penn., as he was detected prowling about the breaker structure by two special guardsmen.

Flag-raising exercises will be conducted at the Central colliery of the Pennsylvania colliery, Pittston, Penn., on Wednesday, May 30, when Hon. H. A. Fuller, presiding judge of Luzerne County, will be the speaker.

An inspiring flag-raising ceremony was held at the Continental colliery of the Lehigh Valley Coal Co., Centralia, Penn., on May 12. Appropriate addresses were made by H. J. Heffner, local division superintendent, F. R. Schadd, district superintendent of the company, and others.

A flag-raising ceremony was held by employees at the Scott colliery of the Susquehanna Coal Co., Kulpmont, Penn., on May 12, the workers being assisted by local residents. Appropriate remarks were made by Charles Groff, assistant superintendent of the company, and others.

Word was received at Hazleton, Penn., on May 14 from John P. White, international president of the United Mine Workers, that all union coal miners enlisting for military service would be exempted from payment of dues and maintained in good standing during the period of absence.

Thomas A. Edison is collaborating with British admiralty experts on a submarine detector. The device is already said to have given very satisfactory results in restricted harbor waters. A network of wires on the ocean bottom is said to register on a meter on shore the passage of a U-boat and its location on a mapped-out area.

Appeals of the anthracite operators to their men to remain at work and help speed up the production of fuel are halting enlistments here, according to the local recruiting officers. Only three men were sent from this section on May 16 to Fort Slocum, N. Y., against an average of 12 every other day for the first half of the month.

From funds subscribed among themselves, the employees of the E. E. White Coal Co., at Glen White, W. Va., floated a large flag, measuring 12 x 24 ft., from a 40-ft. pole fastened at the highest point of the shaft headframe. A feature in connection with the flag-raising was the willing, loyal and voluntary support given the affair by unnaturalized residents of all classes.

Canada will not permit Americans to enter the Dominion who have fled from America to escape conscription. No Americans liable for military duty will be permitted into Canada until the draft is finished. The United States has always taken steps to prevent escape of Americans to the West Indies and Central American countries.

It was reported in Logan, W. Va., that the United States Army recruiting officers at Huntington refused to enlist applicants from the mining districts. It is said that a number of miners from Logan County, who applied for enlistment, were told that they could serve their country better by returning to the mines and producing all the coal they could than by entering the army.

Despite the fact that Ascension Day has uniformly been observed heretofore as a holiday, the miners in Hazelton, Penn., this year, at the behest of the mining officials, continued at work in order that there should not be the least loss of tonnage during the heavy demand now prevailing. The churches coöperated by arranging early services for the men before starting time at the mines.

The Lehigh Coal and Navigation Co., which already has shown its patriotism in different ways since the war began, obtained the service of C. J. Hatley, a graduate of the New Hampshire College of Agriculture, to take charge of its agricultural work and to act in an advisory capacity to any of the employees or others who may wish such assistance. The company says Mr. Hatley is at the service of the community without charge.

The *Boston News Bureau* quotes President Louis W. Hill, of the Great Northern, as saying: "The fact that the Government has not up to this time endeavored to fix prices of food products has resulted in preparation of a larger crop acreage in the Northwest than ever before, and the soil is in the best condition I have ever seen at this season. It is too early to venture predictions regarding the year's harvest, but the situation is the most promising I have ever known at the beginning of May."

One of the most unique flag raisings in the history of the region around Shenandoah, Penn., took place at the Draper colliery on May 14, when the inside employees raised two American flags 1000 ft. below the surface of the Mammoth vein gangway in honor of two of their fellow-workers, Edward Phillips and Robert Hahn, who have enlisted and gone to the front. The employees of the inside workings were all there with the exception of the two patriots, and all joined in the patriotic ceremonies in the depths of the mines.

The Labor Situation

General Labor Review

Strikes are now rare in the anthracite mines for the men are not made discontent by short time or by the excessive profits of their employers. There are, of course, traveling agents endeavoring with promises of higher pay to wean the anthracite mine workers from their regular employment. This makes for some discontent, but it does not have the same effect as is shown in the central Pennsylvania field where there is a large amount of labor recruiting being done at the expense of the regular operators by fly-by-night coal men who are in business solely for the present and do not care what will happen after the war, for they do not then expect to be in the business or are willing to take chances. They do not worry, therefore, about the high prices they may have to pay for labor, but their specious generosity has nevertheless a bad effect, for the miners feel assured that if the small operator can pay an exorbitant wage rate with all the disadvantages by which he is faced and still make a large earning surely the bigger operator can pay more and make as much. So, as the competition for their labor is within the industry, the effect is far more distressing than in the anthracite region, where the competition is from outside parties and furnishes no indication of the profitableness of coal mining. In fact coal mining is hardly as profitable now in the anthracite region as it was before the war. The recent increase in price is far less than the consumers of domestic sizes had any right to expect.

We Deplore Profits But Know We Must Have Them

Price regulation is the only thing that will steady the bituminous region, and the promise of the Federal Trade Commission that it will inquire into bituminous prices and attempt their regulation is meeting with no great disapproval. Reduction of profits, however, involves less income and less excess profits to tax and reduced capital accumulation for the purchase of the Liberty Loan bonds. If profits are to be curbed, it is necessary for the prosecution of the war that the workingmen of the country endeavor from their savings to make up for the inability of the Government to obtain the necessary money from accrued capital. The Government cannot well conscript capital in use, for some of it is in material form and cannot be so used; and the fluid wealth is needed for the operation of material capital. It is only the usufruct of industry and the savings of labor that can be used for war expenditure.

It would seem a dangerous experiment, therefore, to put the coal business back into its former bankrupt condition when the public is seeking to obtain tax dividends from the operator's profits and loans from his income.

Neil's Dicta Refer to Practices, Not to Persons

As stated, the labor situation in the anthracite region is abnormally quiet, and this condition is creditable to both miners and operators, for both have a hand in the peacefulness of operation. News such as there is, is comprised in a relatively unimportant decision of the Anthracite Conciliation Board. Charles P. Neil, the umpire of the board, in sustaining an appeal of 50 miners at the Lattimer colliery of Pardee Brothers & Co., declared that when a decision was made involving certain individuals that dictum was operative for all employees similarly situated. Advanced payments must be made to all the men working in like occupation and back payments must be granted in accordance with the advances. The Lehigh Valley Coal Co. has granted its unorganized shop employees at Drifton an increase of 35c. a day dating from May 1.

Central Pennsylvania Mine Workers in Doubt

At the time of going to press it is not possible to foreshadow the exact status of the labor situation in central Pennsylvania. A meeting of the mine workers was called for Wednesday, May 23, and the terms of the agreement were then submitted to the delegates.

Apparently there will be no further increase in tonnage rates to those miners whose loaded wagons are pulled to the room mouth by the company, but 5c. per ton will be added where the miner has to push out his load as well as push in his empty.

The miners are not any too friendly to the agreement, and it is reported that a faction is being organized to fight it. The miners say that the operators have backed down three separate times in the last few weeks and can be made also to take the last ditch.

Their leaders, however, realize that excessive increases in wage will only open up the matter from end to end of the country where the miners have been satisfied without increases in dead work and yardage and with less generous increases in day wages and tonnage rates.

Reasonable Settlement Is Essential to Nation

A general dissatisfaction with the new contract would put the leaders in an extremely awkward moral position, and it would tend also to put up wages in other industries with consequent all-around disturbance in prices and values. As a result the country, facing the enemy, might have its whole labor fabric unsettled.

The mine workers in central Pennsylvania are in a surly mood and hold for their 33⅓ per cent. as for some religious creed. However, since the most recent tentative settlement was made at Washington, D. C., several men have gone back to work and the mines are pretty generally in operation in central Pennsylvania. The mines thus starting include those at Portage, Cassandra and Bens Creek, the headquarters of the central Pennsylvania insurgency.

In Somerset County the Maple Ridge Coal Co. at Holsopple and the Brothers Valley Coal Co. at McDonaldton, both in the Berlin field, are increasing their output despite the efforts of the United Mine Workers of America.

Not Enough Mine Workers To Man the Many Mines

In eastern and southeastern Kentucky there is a loud outcry for more mine workers to man the mines. Despite higher wages, the giving of commissary supplies at cost, the offering of free garden plots and every inducement to mine workers, the companies find themselves about 25 per cent. short in their labor supply. A representative of the Consolidation Coal Co. stated that within the month labor in the company's big operations at Jenkins, McRoberts, Burdine and Dunham has been reduced 30 per cent., while similar conditions prevail at other plants of the company. The opening of new mines in scores has much to do with the shortage of labor.

In western Kentucky the supply of men has been reduced by 20 to 50 per cent. It is said that men have migrated in numbers from the mines where the labor agitators have been at work. At Madisonville, Ky., the city council has tried to restrain the draft on the mines by placing a $400 annual license on all labor agents and employment bureaus that enlist labor of any kind in that section for employment elsewhere.

As further evidence of labor shortage it may be added that the road builders are afraid to take contracts for fear that they will not be able to secure the men for work on the roads and that the Kentucky Mining Institute at its recent meeting declared, May 19, against enlistment and conscription at the coal mines of the state.

Short Day Introduced Into More Kentucky Mines

It should be recorded that the Consolidation Coal Co. has introduced the 8-hour day into its mines at Jenkins, McRoberts, Dunham and Burdine, following the precedent already set at its mines in the Georges Creek and Fairmont fields. Motormen and trackmen now get $3 per day of 8 hours, while miners get $2.48 and 52c. a car. Outside laborers receive $2.16 per day.

The 300 mine workers of the La Follette Coal and Iron Co. at La Follette, Tenn., between Jellico and Coal Creek, have gone on strike for a 20 per cent. wage increase. The men at the Gem mines of the same company, located at Peabody, some miles to the north, are expected to join in the demonstration.

The representatives of the United Mine Workers of District 21 met the representatives of the Oklahoma Coal Operators' Association at McAlester and in 15 minutes made a new agreement—a remarkable record for speed. The mine workers wanted what had been granted in the Central Competitive

field; the operators believed the miners were entitled to that concession and granted it to them without delay.

It is a good example for contract making to follow. It cannot always be done so easily, but when conditions favor it as they did in this instance, there ought to be no difficulty. Both parties ought to meet merely to discover the equities of the situation and they ought to realize that they are there not to gain an advantage but to render an impartial decision. Where the case is clear, there is no reason why 15 min. should not be time enough in which to settle it.

Pick and machine mining are advanced 10c. per ton. Day laborers receiving $2.98 and $3 per day will be given $3.60. Men on monthly wages and all classes of day labor are advanced 60c. a day except as follows: Trappers receive $1.90 per day, and all boys now being paid $1.57 per day shall be advanced to $1.90.

When the company orders a miner to clean up a fall or do other company work he is to be paid at the rate of $3.60 per day for 8 hours. But this rule does not exempt the miner from taking proper care of his working place. Should negligence at the face cause a fall, the miner would have to remove it at his own charge.

The new scale was made retroactive to date from May 1, 1917. It will expire July 31, 1918, but will be subject to modification on Apr. 1, 1918, if the new contract then made by the Central Competitive District advances wages. In that case the same advances shall be made as in the Central Competitive District, and they shall become effective as from Mar. 16, 1918.

In Texas the coal operators have agreed to increase the price paid the miners 12½c. per ton for screen coal. The mine workers will receive an increase of 20 per cent. The advance will amount to $250,000 a year and will affect about 2500 men. The agreement came quite unexpectedly, as the operators had flatly refused to advance wages.

Companies Consolidate

The Ottumwa Box Car Loader Co. has purchased the Christy Box Car Loader Co. The Ottumwa company has bought all the Christy patents, all its patterns and its entire business, and all this property has been moved to the Ottumwa Box Car Loader Co.'s factory at Ottumwa, Iowa.

The Ottumwa company will be prepared to furnish Christy loaders to anyone desiring these machines and will also be prepared to furnish repair parts.

In 1898 J. M. Christy, of Des Moines, invented what is known as the Christy box-car loader, and the first machine was built in that year. This was three years after the building of the first Ottumwa loader. Since that time Mr. Christy placed on the market a number of models of loaders and made many improvements in his first machine, all of which have from time to time been patented.

During the time between 1898 and the early part of 1917, at which time Mr. Christy, after a short illness, died, a large number of Christy loaders were sold throughout the United States and Canada.

Believing that the addition of the Christy types of loaders to the large number of types already manufactured by the Ottumwa company might be a valuable acquisition to its business, the Ottumwa company, before Mr. Christy's death, had some negotiations with him with a view to buying out the Christy patents. After his death, the negotiations were carried on by his sons, with the result that the Ottumwa company purchased their entire business.

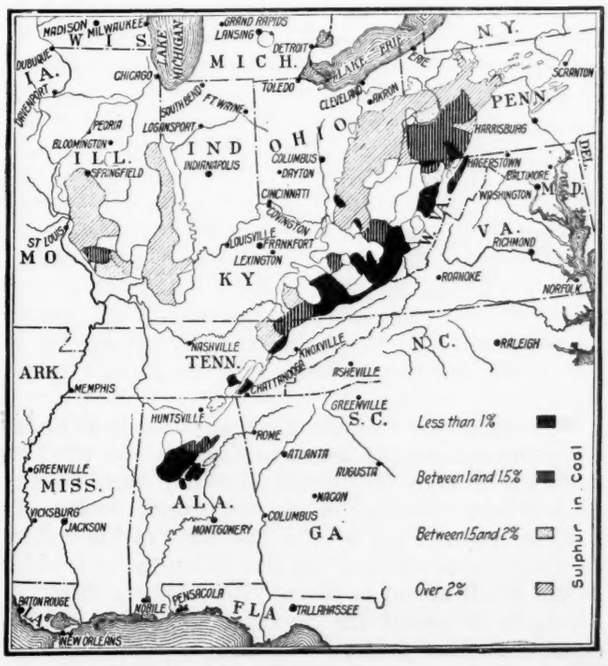
The first Ottumwa box-car loader was built and put in operation in the mine of the Phillips Fuel Co., near Ottumwa, in 1895. Needless to say this machine did not prove a success. However, Henry Phillips and W. E. Hunt, who were working together to perfect a loader which would load coal without breakage, were not disappointed or discouraged because the first model did not perform the task they wanted their loader to accomplish. The result was that a second loader was built and put in at the mine of the White Breast Fuel Co., Forbush, Iowa. This machine was of an entirely different make, and while it was far from being mechanically perfect, it was the first real loader ever offered to the coal operators that would load coal into a box car without injuring it, and damaging the car.

In the 22 years that have followed since the first experiments were made, the Ottumwa Box Car Loader Co. has made many improvements in its loaders and has added a number of patented features which have been responsible for the success of the Ottumwa company. Today there are hundreds of Ottumwa loaders in operation, and many different models of loaders have been made to meet various conditions.

The Ottumwa company manufactures stationary loaders, semi-portable loaders that move a short distance, and full portable loaders that are self-propelling and move under their own power wherever tracks are provided. It also manufactures what has been called crawfish loaders, which move at right angles to the loading track and can be taken backward over one or more tracks. In this manner it easily passes all run-around tracks that might, except for this feature, be blocked by the frame of the machine.

The company manufactures also special loaders with special receiving hoppers and chutes attached for taking care of almost every requirement. In addition to this, it is the sole manufacturer of the big rocking cradle loader which tips the entire box car. This latter loader is designed principally for mines with large tonnages, where it would be impossible to use loaders of smaller varieties.

The Ottumwa company also has a large unloader for unloading box cars. This is of the cradle type and with some additions to the regular cradle loader, a simple machine performs the operation of unloading the car as well as loading it.



MAP SHOWING SULPHUR PERCENTAGE IN COAL OF EASTERN HALF OF UNITED STATES

Editorials

Activities of the Federal Trade Commission

Following the receipt of several letters from the Federal Trade Commission recently, there come many rumors of radical changes to be wrought in the methods of selling coal. Just now the prices of the individuals vary, although those given are from 25c. to 40c. higher on egg, stove and chestnut than are asked by the big shippers, and from 50c. to 80c. higher on pea coal. These rates are being paid without complaint.

While the smaller shippers are quoting so-called circular prices, the idea of the commission seems to be that all shippers will be asked to announce their prices by printed circulars each month and then adhere to them strictly. Also, there is to be a stop put to the practice of one middle house selling to another and in that way accumulating commissions, which for the past six months have grown beyond all reason in some instances. Coal is to be sold at circular rates directly to the consignee for whose ultimate use it is intended. It is understood further that some action will be taken to eliminate entirely, or minimize to the lowest margin, the transferring of shipments en route, usually at higher rates.

It is also known that the commission looks with particular disfavor on brokers as being just so much lost motion in the business of getting coal to the consumer and will insist on operators disposing of coal through their own selling forces. Where the operators have no selling force of their own, it is likely that brokers will be allowed to act as selling agents on a restricted commission basis, probably not in excess of 15c. per ton. It is also rumored that the operators are to be asked to make frequent reports to the commission, showing the tonnage produced and the prices at which it was marketed.

The distribution of coal is to be given special attention, and already Samuel B. Warriner, president of the Lehigh Coal and Navigation Co., has been designated a committee of one at Philadelphia to keep in touch with this feature of the trade and report accordingly. Forms of reports will be used showing how the various territories are being cared for. There will possibly be more effort made to have the operators look after their usual business. Already some of the shippers have declined to accept orders, stating that they are only endeavoring to handle business for which they are the regular source of supply.

It would appear that the whole situation is to be intelligently and conscientiously handled, and the effect on the trade will go far toward dispelling such panicky times as have prevailed for the past several months. In this connection it can be said that some of the brokers are greatly exercised over the impending changes, which do not at all appeal to them. The ultimate object, of course, is to protect the consumer, and there is little doubt that great progress will soon be noticeable.

While it is known that of late there have been many meetings and much discussion, there have as yet been no definite announcements of new policies. It is apparent that the marketing of the family sizes is being given the first consideration. Little can be learned at this time about the commission's attitude toward the consumers of steam sizes, on which, in most cases, the prices have practically doubled.

Limiting the Price of Coal

The trend toward Government control of those industries vital to the welfare of the country is too obvious to require comment. The coal industry takes a preëminent position in this category, and it is clear that the Government will not countenance the prices for fuel now in effect, much less any further advances. All will agree that no one should be allowed to amass exorbitant profits in a time of national emergency such as this, and no class of individuals will respond more quickly to this sentiment than the coal-mining fraternity.

The question first to be considered in this connection is how a fair and equitable arrangement for limiting prices can be effected; and it is a question involving grave economic considerations that are far more complex than is indicated by first appearances. It is a matter that will require careful study and exhaustive investigations. The only precedent that we have is the experience obtained in Great Britain during the two years the Price of Coal (Limitation) Act has been in effect. An analysis of the methods and results obtained with this measure is, therefore, of especial interest at this time.

One of the chief faults developed in this Act is a certain vagueness and difficulty in a proper interpretation of its various provisions, particularly as to the actual prices it is permissible to charge. The bill states that no increase of more than $1 per ton above the price ruling during the year ending June, 1914, will be permitted. Whether this means the average price during this period, or the maximum or minimum, is in question, and the producers naturally interpreted it as meaning the maximum.

Another weak point is whether it is intended to apply only to prices at the mines or to those in the wholesale and retail trade at the distributing centers as well. It is frankly acknowledged that all the companies have not adhered rigidly to both the letter and spirit of the Act, and that prices are frequently being obtained that are substantially higher than was intended.

The great competition for full supplies has made the matter of price a secondary consideration, and a surprising feature of the case has been the fact that Government departments, as well as Government controlled industries, have often been the greatest offenders in offering excess prices. So anxious are the buyers to obtain supplies that only a few of these cases have apparently been reported to the authorities, and even in these instances there seems to have been a tendency on the part of the Government to overlook the matter, for the time being at least.

Apparently Great Britain did not extend the price-limitation rule to export business. At any rate, the fuel exports in 1916 were valued at $335,000,000, as compared with $330,000,000 in 1913, though the actual tonnage exported in 1916 was only a trifle over half as much as in 1913. Obviously, companies participating in this export business had an unfair advantage over their competitors that were limited to domestic business at a moderate profit.

While it was generally agreed that the increase of a dollar per ton was in most instances fair and sufficient to compensate the companies for increases in wages, supplies, etc., it has also been found that there were instances where this was not sufficient, with the result that some companies have been operating at a loss. One other disadvantage in holding fuel prices at moderate levels has also been developed—namely, that it tends to do away with economy in consumption, which is so essential when the resources of the country are under such a tremendous strain. There is no doubt that substantial increases in price would be a potent influence in restricting consumption, especially among domestic consumers.

This, in brief, has been the experience of Great Britain in the matter of fixing fuel prices. It is to be hoped that our Fuel Board will study these results carefully and profit by the experience of our predecessors in this line. The coal men should review the situation carefully and prepare to adapt themselves to the new conditions that now seem inevitable.

Conscript the Chronic Absentee Miner

It is not known at this writing what industries will be exempted from draft in the Government's first call for a half a million men. It is more than likely that the coal industry will be exempted. It has become obvious to everyone that this war will be won by the side having the heaviest and greatest amount of artillery, and which is at the same time able to keep its industrial organization in smooth running order. Upon no single line is the successful accomplishment of this end so entirely dependent as the item of having an adequate fuel supply. There must, therefore, be no attempt to interfere with the production of coal until the situation has become urgent.

When this period of urgency arrives, however, the first draft from the ranks of the miners must be made from those who are chronically absent from work. Not only is this class responsible for the loss occasioned by their own absence, but they also exert a baneful and demoralizing effect upon their coworkers who have a greater appreciation of their responsibilities.

Every operator, particularly at this time with labor scarce and consumers crowding the producing interests for every possible ton of coal, has had experience with the exasperating type of miner who works intermittently. Because of the bad example he sets a great many operators would be glad of an opportunity to dispose of him, and once he was drafted into military service the nation could rest assured that it was obtaining the full benefit of his possible efforts. In addition to these results there is no doubt that a provision of this character in the draft measure would be a potent influence in stimulating a greater regularity in the miners' work.

The Increase in Freight Rates

Whether or not the full rate increase petitioned by the railroads should be granted, it is clear that some action must be taken promptly to relieve the present acute situation in which short car-supply and slow movement play so important a part. Recent decisions of the Interstate Commerce Commission encourage us to hope for a speedy adjustment.

In a desire to avoid the expense and delay of submitting full detailed tariff schedules, the carriers asked permission to file the proposed increases in simple general supplement form on a 15 per cent. basis, excepting on certain designated commodities such as coal in important areas, leaving these to be taken up later in the form of specific advances in cents per ton. This general request the commission has granted under the discretion conferred by law, but with the express stipulation that no decision has been reached as to the main question of approving the increases. Reasonable opportunity, the commission said, would be given for the presentation and consideration of protests. All of this, so far as it goes, is in accord with the sentiment of the whole business community that some rough and ready but substantially just method of applying increased rates should be adopted temporarily, while a careful and exact revision is being threshed out with due regard to all the elements in a very complex situation.

It was to expedite consideration that Special Permission No. 41750 was issued by the commission on Apr. 23, 1917. This provides that carriers may file, upon not less than 50 days' notice, special supplements proposing increases intended to be effective July 1, 1917, and in general it supplies the forms and apparatus for reconciling such supplements with rules of the commission previously laid down. Rates on coal, however, are expressly excepted when transported in carload lots from producing fields in Pennsylvania, Maryland, West Virginia, Virginia, Kentucky, Tennessee and Ohio to points in Central Freight, Trunk Line, and New England Freight Association territories, and on anthracite coal from producing fields in Trunk Line territory. Iron ore is also exempt between points in Official Classification territory.

A careful reading of Order "General No. 14" on the same day and also of the explanatory statement by the commission, issued Apr. 25, fails to disclose any bearing upon the coal industry. Commodity rates are unaffected, for the moment, and very likely there will be no further increases in coal rates until the pending petitions have been fully dealt with. It is to be hoped the commission will proceed cautiously in this connection. It might be desirable to limit increases, if any, on coal as well as on other heavy commodities, to some temporary period, in order to lay stress on the fact that any advances contemplated are because of exceptional conditions, and are to expire when those conditions no longer exist. Important disadvantages might well creep in if it were assumed that the coal market, for instance, would remain in its present disturbed condition.

It is gratifying that the Interstate Commerce Commission is showing its readiness to cut red tape when transportation is in a state calling for drastic measures. Certainly the coal industry can expect no relief from the existing acute shortage until the railroads are allowed more generous revenues.

Legal Department

Recent Decisions

By A. L. H. Street

Dower Rights in Coal in Place—Under a conveyance by an owner of land of the underlying coal, in which his wife did not join, her dower rights were not lost by her subsequent signature of an assignment for the benefit of creditors made by her husband covering his remaining property. (Pennsylvania Supreme Court, Shupe vs. Rainey, 100 Atlantic Reporter, 138.)

Damages for Breach of Sales Contract—On breach of a contract to deliver coal throughout a given month, the buyer's damages are to be based on the excess of the contract price above the average market price of the coal during the month. (United States Circuit Court of Appeals, Third Circuit; New York & Philadelphia Coal and Coke Co. vs. Meyersdale Coal Co.; 236 Federal Reporter, 536.)

Injury to Independent Contractor's Employee—An employee of a contractor engaged by defendant to build a coal conveyor at defendant's plant according to plans furnished by defendant cannot be regarded as an employee of defendant, for the purpose of liability for personal injury to such employee, the contractor having exclusive charge of the method of performing the contract. (Vermont Supreme Court, Richards vs. Consolidated Lighting Co., 99 Atlantic Reporter, 241.)

Risk Assumed by Mine Laborer—An employee engaged in pushing cars through tunnels of a mine cannot recover for injury resulting from a car running back over him when his strength proved to be insufficient to enable him to push the car over a hump at a point where the track had been raised to pass over fallen slate, he having previously known the condition of the place. (Kentucky Court of Appeals, Saulsbury vs. Elkhorn Consolidated Coal and Coke Co., 192 Southwestern Reporter, 20.)

Mining Company's Liability for Private Police Officer's Act—A man employed by a mining company to preserve order about a mining camp having wrongfully shot a dog so near a miner's wife that she was frightened into a miscarriage, the company is liable for the resulting injury. The company's liability is not affected by the fact that the man may also have been officially commissioned as a deputy sheriff. (Alabama Court of Appeals, Baladoni vs. Alabama Fuel and Iron Co., 73 Southern Reporter, 205.)

Carrier's Liability for Failing to Supply Cars—In an action by a coal operator to recover damages against a railway company for failure, upon reasonable demand, to supply cars for interstate coal shipments, proof by the railway company as to the number of its cars on other railway lines is irrelevant, there being no claim of car shortage or that conditions in the coal trade were other than normal. (United States Supreme Court, Pennsylvania Railroad Co. vs. Sonman Shaft Coal Co., 37 Supreme Court Reporter, 46.)

Death Caused by Sagging Electric Wire—A mine loader riding on an empty coal car as a customary means of leaving the mine after quitting work did not assume the risk of being electrocuted by an electric wire which was uninsulated and which had sagged down so far that his head came in contact with it while he was alighting from the car, there being nothing to show that he knew that the wire was charged. (United States Circuit Court of Appeals, Fourth Circuit; Gray vs. Sunday Creek Coal Co., 238 Federal Reporter, 325.)

Validity of Spur-Track Contract—An agreement whereby a railroad company laid a spur track over a right-of-way furnished and graded by a coal-mining firm, on an understanding that the firm should have the exclusive use of the track for movement of coal-mine products, was valid and not in contravention of public policy; the spur track not forming part of the railway company's line, but lying on uncondemned private property. (Illinois Supreme Court, Sholl Bros. vs. Peoria & Pekin Union Railway Co., 114 Northwestern Reporter, 529.)

Employer's Liability for Injury to Employee—Where a mine employee sued the employing coal operator for loss of part of his leg amputated because of blood poison which he claimed resulted from injury sustained when a piece of slate fell upon the calf of his leg, he had the burden of proving that the accident resulted from negligence on the employer's part and that the partial loss of the leg was a direct and natural consequence of the accident. (Kentucky Court of Appeals, North Jellico Coal Co. vs. Stewart, 191 Southwestern Reporter, 451.)

Risk of Falling Roof Assumed by Miner—A coal miner assumed the risk of being injured by falling rocks where he was familiar with the danger, although he did little excavating himself, and where he was directed by his foreman to assist in removing rocks which had fallen through collapse of props. While he was so engaged, more rock fell, and the foreman tested the roof. A cracking noise was detected and one of the employees fled the place, but the particular miner remained and was killed by fall of a section of the roof. (United States Circuit Court of Appeals, Eighth Circuit; Hannett vs. Victor-American Fuel Co.; 236 Federal Reporter, 526.)

When Miner Does Not Assume Risk of Defective Appliance—If a miner complained to his pit boss of a defective condition of dumping blocks and was assured by the latter that they would be repaired, and if the miner was injured because of the condition within a reasonable time for the making of such repairs, he cannot be assumed to have taken the risk of the accident. It is only when by lapse of more than a reasonable time without the making of promised repairs that an employee assumes the risk of working under conditions known by him to be dangerous. (Arkansas Supreme Court, Western Coal and Mining Co. vs. Harrison, 192 Southwestern Reporter, 190.)

Liability of Delivering Carriers—Where a shipment of charcoal was carried over connecting lines of railroad the consignee was not entitled to hold the delivering carrier liable for injury to the shipment occurring on the line of the initial carrier, in the absence of assumed responsibility by the terminal carrier. An agent of the latter road having been without authority to agree to pay such damages, the consignee cannot rely upon his promise to pay them, the consignee having accepted the freight with knowledge that the injury arose on the line of the first carrier. (Iowa Supreme Court, Cedar Rapids Fuel Co. vs. Illinois Central Railroad Co., 160 Northwestern Reporter, 353.)

Employees Injured While Volunteering Services Beyond Ordinary Duties—The rule that a mine operator is under no obligation to guard the safety of a trespasser, being liable for injury to the latter only when it appears that the injury resulted from wanton carelessness or willfulness, even though the injured person be volunteering his services in an emergency, does not apply to a mine employee who goes beyond the scope of his employment to assist in protecting his employer's property. Therefore, where a mine machinist, going beyond the contractual scope of his employment, assisted in extinguishing a mine fire, with the knowledge and consent of the pit boss, he was not a bare trespasser, and the mining company is liable for his death caused by suffocation due to negligent starting of a fan after the fire-fighting began, without warning to him. (United States Circuit Court of Appeals, Eighth Circuit; McCallum vs. Western Coal and Mining Co.; 237 Federal Reporter, 1003.)

Subsidence of Surface—Contracts for Reconveyance of Coal Lands—A mining company mined the coal from part of land owned by it, and then conveyed the land, reserving all the underlying coal and other minerals. Nothing was agreed upon concerning support of the surface. The purchaser knew that part of the coal had been mined, but had no personal knowledge as to the manner in which the mine had been worked. A portion of the surface over that part of the land which had been mined subsided after the conveyance was made. Under these circumstances, it is held that the purchaser had a valid claim against the mining company for damages. Where a deed to land contains provision to the effect that the seller shall have an option to repurchase at the average price per acre paid by the purchaser, a court will refuse to require the purchaser to reconvey on exercise of the option ten years after the original conveyance, where the purchaser has in the meantime made valuable improvements materially enhancing the value of the land, and the original seller makes no offer to reimburse the purchaser for the expense of such improvements. (Kansas Supreme Court, Audo vs. Western Coal and Mining Co., 162 Pacific Reporter, 344.)

Discussion by Readers

Electric vs. Oil Safety Lamps

Letter No. 2—When reading the letter of John H. Wiley on this subject, *Coal Age,* May 19, p. 883, I noticed that he mentions the delay to the miner caused by his electric lamp being extinguished; and I wondered whether this trouble would be obviated, as he says, in the use of an oil safety lamp.

The time lost when a miner's lamp is extinguished, to say nothing of the danger from this cause, is certainly an important item in mine work. In my experience, it is an easy matter to extinguish a safety lamp, either by a jar or a knock, especially if the lamp is suspended from the miner's belt, as is quite frequently the case. The same thing will happen if the lamp is set on the floor and overturned.

Even if the safety lamp is supplied with scratchers or other means of relighting the wick when extinguished, it is a common experience among miners that these devices fail when they are most needed. In that case, as Mr. Wiley says, the man is dependent on his buddy's lamp and must borrow this and go for another light, or the two must work with one lamp, at great inconvenience and loss of efficiency. Then, if the one light goes on the "blink," all work must stop, as the men are in the dark.

The importance of this matter is more appreciated when one considers that three or four lamps may be extinguished in a mine during a single shift, greatly interfering with the work that should be performed. It may be that some readers of *Coal Age* can suggest the best practical method of overcoming this trouble and annoyance, and say whether the difficulty is experienced in a greater measure in the use of the oil lamp than in the use of the electric lamp. Relief from the trouble would prove a boon to operators and miners alike.

West Leisenring, Penn. R. W. LIGHTBURN.

The Negro, South and North

Letter No. 1—A short time ago, there appeared in *Coal Age* [Feb. 10, p. 258] an article by "Southerner," which referred to an increasing migration of the negro, from his native abode in the South, in search of a home in the North. The article suggests several possible reasons for the exodus and admonishes the negro that he "will not find a promised land in the Northern coal fields."

While the article rightly describes the South as the country of the negro's birth and to which he is attached by racial and natural tendencies, its reference to the inhospitality of his reception in the Northern coal fields requires modification. It may be true that the Northerner has not the same kind of regard for the negro as have his employers in the south, where the appellation "nigger" has not the same significance or does not convey the same meaning as when used in the North.

In defense of the attitude of the North toward the negro of the South, I want to say that the same rights are extended to him as to any other American citizen, which cannot be said of all localities in the South. In the North, the negro is treated with a broader spirit of liberality, and the intelligent negro appreciates, in a growing manner, the equality of rights there accorded him.

There are conditions in the North relating to education and the elimination of racial differences that invite the negro to migrate hither. Many a negro who has made his home in the North has been able to educate his family, secure, establish and pay for his own home, and start a bank account that will carry him over hard times.

The problem here presented is one that interests coal operators in the South and the North alike. Friendly cooperation between capital and labor is increasing rapidly, as manifested by the almost universal consideration and adoption of workmen's compensation laws in the states. These laws provide generously for the care of injured employees and the surviving dependents of those who are the victims of fatal accidents.

In these times of industrial activity, it behooves the management of all large operations to extend to their employees every right and privilege that is theirs. If this is done in the South, as in many cases we know it is, there will be no general exodus of the better class of intelligent negroes from their native soil and climate. There will result a spirit of coöperation among this class of labor that will bind them to their native home.

Caldwell, Ohio. NORTHERNER.

Reopening a Flooded Mine

Letter No. 4—In reply to the inquiry in regard to the recovery of a flooded mine, *Coal Age,* Mar. 24, p. 533, the first consideration is the unwatering of the mine; and, in that regard, there are two items of particular importance—namely, the time required and the cost of the undertaking.

In my judgment, owing to the uncertainties of the situation, one can hardly recommend the installation of a large pumping plant suitable for the future draining of the mine. At this stage of the game the cost and maintenance of such a plant would be practically prohibitive, and the capacity required for permanent operation would not be sufficient to unwater the flooded mine in a reasonable time.

Allow me to suggest that the use of two large water boxes, when properly designed and employed, would accomplish the desired result in the shortest possible time. Each of these boxes should have a capacity of approximately 600 gal., or about 80 cu.ft., provided the regular hoisting engines could handle this weight of water ($2\frac{1}{2}$ tons) in a single hoist. To expedite the work, the boxes must be provided with automatic valves that would permit them to fill rapidly when lowered in the sump and empty almost as quickly at the surface.

It may be assumed that the effect of roof settlement due to possible creeps and squeezes has reduced the open

area in this mine somewhat more than one-half and, for the purpose of estimate, the cubic contents of the mine may be taken as, say 6,000,000 cu.ft., which would mean practically 45,000,000 gal. of water to be taken from the mine.

Assuming a hoisting speed of 30 ft. per sec., the time required for a single hoist of 1200 ft. would be 40 sec., and allowing 8 sec. per hoist for filling and emptying the boxes gives a bailing capacity of 750 gal. per min. or say 1,000,000 gal. per day, making due allowance for breakdowns, repairs and other delays. At this rate the unwatering of the mine could be accomplished in about eight weeks.

A Large Bailing Proposition

At the Gilberton colliery of the Philadelphia & Reading Coal and Iron Co., it was found necessary to remove 6,000,000 gal. of water per day of 24 hours from a depth of 1100 ft. This was accomplished by a double hoist installed at a separate water shaft. Huge iron tanks were employed as water buckets, each of these having a capacity of 2400 gal. Two hoists were made each minute, which provided ample time for necessary repairs and delays.

Whenever it is deemed practicable, the regular pumping plant can be installed, having a capacity that will enable it to handle with ease the inflow of 200 gal. per min. For this permanent plant, I would suggest employing two electric turbine pumps of the multistage type, which would have the advantage of gathering the water from the sump and elevating it to the surface in one operation and would eliminate valve troubles common to the use of other pumps, provided the mine water is not so acid as to corrode the pumps rapidly.

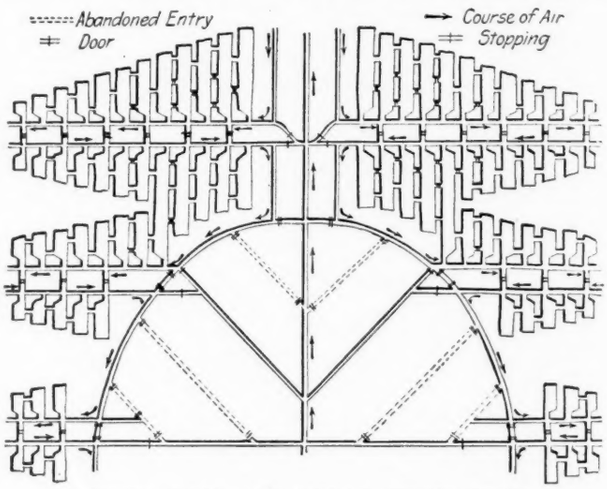
These pumps should each have a capacity of 250 gal. per min. They should be connected with the same discharge line, which would materially reduce the cost of installation and allow them to be operated alternately in 12-hour shifts. The surplus capacity of the pumps would make all necessary allowance for breakdowns and repairs, or for any increase in the flow of water into the mine. In my opinion this would eliminate the necessity of having a sump of unusual size, since it would hardly happen that both pumps would be out of commission at one time.

Recommends the Room-and-Pillar System

In regard to the most practicable system of working this mine, under the conditions described, the room-and-pillar system appeals to me as the proper method to adopt. The fact that the longwall system, previously employed, proved a failure would seem to indicate that the same difficulties would be encountered if that method of mining was to be continued. Even if the panel system was to be adopted, there would be the danger of a squeeze or creep over-riding the pillars unless these were exceptionally large.

On the other hand, the room-and-pillar system will afford opportunity to so regulate the size of pillar and opening in the mine as to properly control the roof pressure and, at the same time, provide for the economical handling of the coal. Later, when the field has been worked out, the pillars can be withdrawn. It will be necessary, however, to plan the working of this mine in accordance with the conditions, which are not fully stated in the inquiry.

Assuming that the mine was previously worked on the 45-deg. system of crossroads, I would suggest starting the room-and-pillar work as indicated in the accompanying plan, by extending the main entries and making these the main haulage roads leading to the shaft bottom. Cross-entries can be driven from these and from the heads of the diagonal roads, as shown in the figure. These cross-entries may be driven 350 ft. apart and 14 ft. wide, to provide sufficient room at the side of the road for the storage of the waste caused by brushing the



STARTING ROOM-AND-PILLAR WORK FROM A LONGWALL FACE

roof to make headroom on the roads. The width of pillars must be governed by roof conditions.

I would prefer to mine this coal with shortwall chain machines, using 250 volts, direct current. It seems reasonable to suppose that, with competent management, this mine could be brought to a capacity of 500 tons daily in six months' time, unless the conditions are found to be exceptionally bad when the water has been drained from the mine.

W. H. Detty,
Tulsa, Okla. Mine Foreman.

Duties of Mine Examiners

Letter No. 5—Having but recently secured my certificate to act as mine examiner in this state, I am naturally much interested in the opinions expressed in regard to the duties of examiners marking out a place where dangerous roof is discovered. I was particularly glad to see the letter of County Mine Inspector Elvis Williams, and to know his opinion on the matter.

It is my belief that the rules of the mine must largely govern the examiner in respect to keeping the men out of a place where he has found a loose rock. The miners in this district are not required to secure or take down loose rock in their places without receiving extra compensation for this work.

When a mine examiner finds a loose rock in a place, it is the custom for him to mark the rock with a cross, showing that it is to be timbered or taken down. He then puts up a conspicuous sign, as the law requires, which is a warning to all men to keep out. Having done this, he enters the fact in his report book.

In the morning, the mine manager (foreman) reads the report and either sends a timberman to make the place safe or instructs the miner working in that place

to do the work, if he thinks him competent. The miner must do this before proceeding to load coal or do any other work.

Should the mine manager fail to read the report or neglect to have the danger removed, and the men proceed to work in the place, he is responsible for any accident that may happen, and the examiner is exempt from blame, as he performed his whole duty when he made his report.

There are many foreigners working in the mines who are wholly incompetent to keep themselves safe and who are dependent on the mine officials in this respect. There is another class of miners who disregard any danger marks or instructions of the mine manager and proceed at once to load coal or do other work when they know their place is not safe.

FATAL RESULTS OF DISOBEYING FOREMAN'S ORDERS

An instance occurred not long ago where the mine manager instructed the men working in a place to set certain timbers to secure the roof, which had been marked by the mine examiner that morning. Instead of doing this, however, they went to work at once loading coal, paying no attention to the loose top above them. They would have continued in this manner had not the driver refused to pull their coal until the place was made safe. When the matter was reported to the manager, he ceased to allow miners or loaders to make their own places safe, as he was satisfied that they could not be depended on to do this work before starting to load their coal.

A mine examiner is often called upon to do other work in assisting the manager when such work does not interfere with his duties as prescribed by law. He may be asked to report the number of loaded and empty cars standing on the sidetracks or in rooms; or water that needs to be bailed from the face before men can work there; or places that need timber or rails; or switches that should be laid and other matters that will enable the manager to direct the work more quickly in the morning. In this way, an examiner many times can be of great assistance to the manager. OSTEL BULLOCK.

Herrin, Ill.

Preventing Mine Accidents

Letter No. 3—Many accidents, often fatal, are caused by the men performing the work blindly following the instructions given by a mine foreman who, perhaps, has not visited the place and, therefore, is not acquainted fully with the conditions. This fact was brought out in one or more of the letters that recently discussed the question of cleaning up a roof fall.

In my opinion, men should not be employed to perform dangerous work who are incapable of judging for themselves what is necessary to secure their own safety. It would be a case of putting the wrong man in the wrong place. However, an accident may happen when the right man is in the right place, and the utmost care and foresight cannot always avoid such occurrences.

An experienced timberman who is familiar with taking down roofs, cleaning up falls and timbering bad places, daily venturing his life in the performance of his work, knows best how to protect himself under all conditions. As timberman I have often disregarded the foreman's instructions, because I found the conditions quite different from what he had expected and a change was necessary to secure my own safety.

The fall may be a large one when the foreman had expected it was of little account. Whenever attempting to secure a special piece of roof or starting to do other like dangerous work, I always consult with those present who are competent and get their ideas as to the best method to proceed. Such caution is necessary if we are to avoid accidents as far as it is possible.

Mammoth, Penn. D. L. AINSLEY.

Letter No. 4—While we can all indorse the statement of D. H. Perdue, *Coal Age*, May 5, p. 801, that close supervision is necessary in order to decrease the number of accidents in mines, few will agree with his suggestion that the publication of these accidents, the display of safety signs and the showing of pictures illustrating how accidents occur have little value in preventing them.

The question of preventing accidents should be considered from a broad standpoint. Safety signs, pictures and other optical methods for arresting the attention of men who are naturally careless or forgetful are merely a natural scheme of advertising the need of more care. Now, large advertisers generally concede the fact that, in order to obtain success in advertising, constant presentation is necessary to arrest public attention and bring people to appreciate the facts presented. It is well known that an article soon drops from sight when it is not advertised.

In other words, the advertising of any article, creed or principle is simply an educational campaign conducted through the medium of the eye; but, since the rate of absorption of facts that are of minor interest at the time is slow, success in impressing their importance on the mind is only attained by constant repetition, and this is really what safety signs and like methods are doing. At the best, the impression made on the minds of workmen that greater caution is needed in the performance of their work is a slow process.

Imagine the change effected in thousands of minds, through a long period of time, by this means, and one is convinced that all the methods pursued are for the general good. It is true there will be many who will never be impressed but will continue to be a law unto themselves and follow their own way, but the truth remains that much progress is being made, although the results are disheartening at times. NOVA.

Montreal, Canada.

Reducing Ventilation at Firing Time

Letter No. 2—In reply to the letter of "Crux," *Coal Age*, Apr. 28, p. 762, allow me to say that the suggestions made in my previous article were not offered as a remedy for all the ills relating to mine explosions. I merely intended to state clearly a practice that has been in vogue for a considerable time in Iowa mines where the coal is blasted from the solid and, as far as anyone knows, no marsh gas has ever been detected.

Mining conditions in Iowa differ materially from those in many other states, with respect to the freedom of the mines from gas. I have worked in these mines almost continuously for 30 years, in various capacities that have afforded me excellent opportunities for studying the results due to different practices.

As claimed in my previous article, which appeared in *Coal Age*, Mar. 31, p. 549, I consider the essential factors that contribute to a dust explosion in a mine the following: Solid shooting, dust suspended in the air and a sufficient supply of oxygen. Admitting these to be essential to such explosions, let me resort to a process of elimination that will save time in reaching the point on which we may differ. No one has ever disputed the part that solid shooting and coal dust play in the production of a mine explosion, but the moment the presence of an adequate supply of available oxygen is mentioned it arouses opposition.

In my opinion, it is as important to limit the supply of oxygen in the mine atmosphere, under certain conditions, as it is to prohibit a hole being drilled beyond its chance; or to enforce the loading out, or to saturate with water, or cover with incombustible material the coal dust produced in mining operations.

Shotfiring in Iowa Mines

Experience has been and always must be the determining factor. Permit me to explain my meaning more clearly by relating what often happens during the firing of shots in the mines in this state, at points where the workings are well advanced. Let us suppose that a misplaced charge or hole has produced a blownout shot and started a local dust explosion. Much flame and violence is manifested at the point of origin and, frequently, at a considerable distance away, in the mine passages. Following the path of the explosive wave, however, it is observed to show evidence of increasing weakness, until completely exhausted it ceases owing to a lack of one or more of the essential elements of explosive combustion.

Now, analyzing the situation, the solid shooting producing a blownout shot was the original cause, while the fine coal dust blown into the air and the supply of oxygen have been the sustaining factors in its propagation. But we know that, almost without exception, it is not the lack of coal dust that stopped the explosive wave and, therefore, it must be the lack of available oxygen. It is on these facts that my conclusion is based.

Let me refer again, briefly, by way of corroboration, to the incident cited in my article where the sinking of a new air shaft near the face of the workings of a large mine was followed by numerous windy shots and local dust explosions in the workings. What was the cause? The miners drilled, charged and fired their shots in precisely the same manner as previously; the same dangerous quantity of dust was present on the roads and in the workings; but the air supply was increased and contained a higher oxygen content than when the current was compelled to travel a mile and a half underground, before reaching the face of the workings. It is clear to my mind that the increased supply of available oxygen was responsible for the conditions that resulted in that mine.

In closing, let me say that the most trouble is experienced, and dust explosions are more frequent, in mines that are newly developed. Especially is this true in the winter season when it is almost impossible to limit the air supply in mines where natural ventilation is the controlling factor. In such mines, especially during the first winter, the custom prevails of stopping the fan from thirty minutes to an hour before the time for firing shots in the mine, the purpose being to reduce, as far as possible, the oxygen content in the mine air, hoping thereby to reduce the liability to explosion. This practice, in Iowa, has given gratifying results, as its numerous advocates will testify. The practice, of course, has its limitations and could not be applied in a gaseous mine.

W. E. Holland,
Albia, Iowa. State Mine Inspector.

Prosperity and Wages

Letter No. 1—When an industry enjoys a temporary period of increased prosperity, it is usual for the wage earners in that industry to seek higher wages, claiming that they should share with their employers in the increased revenue. The coal industry is no exception to this rule.

The coal miners of England, under the pressure of war-time conditions, struck for higher wages at the risk of being judged unpatriotic. One cannot but commend both the operators and the miners in this country for the manner in which they met the approach of similar conditions here. It speaks well for our coal industry that the demands for higher wages or better conditions have not been greater, in the face of the advancing prices in necessities that have so largely increased the cost of living, while the unprecedented demand for coal has brought untold revenue to the operators.

It is true, of course, that in most cases miners have been bound by contract to accept a specific rate; but in spite of this fact they are to be commended in that they showed no disposition to break their contracts. The same cannot be said of all operators, who have in some instances abrogated their contracts with their customers.

It is not only morally wrong but an economic mistake for an operator or dealer to take advantage of a temporary condition and offer that as an excuse for failure to fulfill his contract. But, though the temptation has been strong, operators and miners alike have, for the most part, shown the true spirit of coöperation. The operators, on the one hand, have manifested a willingness to grant an increase of wages, while the miners in union and non-union fields alike have kept steadily at their work.

Right and Wrong of Wage Increase

The situation that has developed recently has called forth much expression of opinion in regard to the right or wrong of wage increases, and I may be allowed to give my own views on this subject. Speaking in a general way, I believe wage increases should be made voluntarily by employers, as conditions may permit. I do not accord the worker his right to demand an increased wage, except under conditions that justify such action.

It may occur, however, that the operators in a non-union field have availed themselves of a favorable opportunity to reduce wages or to hold them at a low level. But, because peculiar conditions make this possible, it does not follow that an operator is justified in taking such an advantage. In union fields, operators and miners alike must, of course, abide by their contracts. But it is commendable when operators, in such fields, grant wage increases or better working conditions as opportunity makes this possible.

Public opinion is the great criterion and would uphold the wage earner in demanding his rights, in such a case. Unionism or collective bargaining is a power that can only be used when it enjoys the benevolent neutrality of

the people. This power can only be employed in securing justice and equality of rights. There is no virtue in keeping a contract that is easier kept than broken, or that provides a greater benefit than would otherwise result. The virtue is in living up to obligations under the stress of ill conditions.

It has been suggested that favors granted to miners are frequently regarded by them as their right, and that an increase of wages granted voluntarily might have the effect to establish a precedent that could not be maintained. In order to avoid such a condition, the wage increase can be made in the form of a bonus, with the understanding that it can be withdrawn at any time when conditions may require.

The legitimate basis for estimating bonuses is a certain average production, in which miners, motormen or drivers and daymen alike are interested, but, here, the salaried men are often overlooked. The gifted paragrapher of the *Ohio State Journal* says, "About the only difference between salaries and wages is that wages are raised in times like the present," and I would add, The salaried man is usually compelled to do a little more than usual to earn his salary, at such times.

I am aware of the difficulties of paying bonuses on production. I recognize that many workers, stimulated by the thought of securing the bonus, will disregard safety—miners neglect to set props; motormen exceed speed limit, while trackmen and timbermen will slight their work to secure the desired results. But, I am convinced that these difficulties are not insurmountable, while the advantages gained are increased production, more satisfied workers and a general coöperation throughout.

New Straitsville, Ohio. GEORGE N. LANTZ.

Prosperity and Booze

Letter No. 1—I was glad to see the editorial, commenting favorably upon the action taken by the E. E. White Coal Co., Glen White, W. Va., which appeared in *Coal Age* not long ago [Vol. 10, p. 1015]. I have since been waiting in the expectation of seeing this question further discussed. Certainly, the coal company that took such action and gave orders to all its superintendents and foremen to discharge from its employ men known to be drinkers is to be commended.

That whiskey is the worst enemy of efficiency is well demonstrated by the fighting powers of Europe, who have prohibited the use of strong drink by the armies and largely restricted the drink habit at home.

In the State of Illinois, where many towns are now dry, a new stand is being taken to abolish the use of alcohol, and an effort has been made, through the Bruce bill, to drive out the liquor business from the state. This should bring great rejoicing to that large class of citizens who have at heart the best interests of the state and their several communities. While a state-wide prohibition is not to be expected in Illinois, there is hardly a question but the liquor traffic will be dealt a hard blow.

There is a growing sentiment, expressed in the public press of today, among democratic leaders who have formerly favored the liquor element, to line up in support of the Bruce bill, believing that it offers the only sane and sensible solution of this great question. The feeling is growing that industrial prosperity requires the abolition of drink. This will undoubtedly cause a howl from the liquor interests, and the old argument will be advanced that the tax revenue derived from that source cannot be lightly set aside.

In reply to such an argument, is it not true that, while the saloonkeeper pays the major portion of the taxes, he receives in return the greater benefit and the state suffers from a decrease in industrial efficiency? On the other hand, if the burden of taxes is increased by abolishing the liquor traffic, the benefit derived therefrom will be the greater health and happiness and the greater prosperity of the people.

My experience as a saloonkeeper and a hard drinker, in the old country, as compared with my present condition in this country, where I have learned to let liquor alone, makes the question of prohibition appeal to me forcibly. Since coming here my desire has been to improve my condition, and this has resulted in greater happiness to my family. My conclusion is that prosperity and booze are never partners in life. Booze is the greatest enemy of prosperity. GASTON LIBIEZ.

Peru, Ill.

Making Up Cartridges in Mines

Letter No. 7—I have followed with interest the several letters on this subject and want to say that, in view of the large number of fatalities and minor accidents that have resulted from powder being kept at home, the mine operator or superintendent who allows this dangerous practice is 20 years behind the times.

The Du Pont Powder Co. and, I presume, most other companies that manufacture powder for blasting in mines, furnish it in cartridges ready for use. The powder we are using at present comes in two sections, each containing 12½ lb. The powder is wrapped in cartridges formed of two layers of the best quality of paper, these cartridges being 30 in. in length and linked together by leaving 6 in. of spare paper between them. Each section contains about 11 ft. of powder, or 13 ft. including the spare paper that forms the links.

In order to avoid the danger of the powder being ignited accidentally, it is placed in a tar-coated metallic keg. During the 12 years that I have worked for the same company as a miner, I have not known of a single case where a miner has been burned when making up a charge of powder.

Some years ago, I recall that the miners in the anthracite region made a practice of taking their powder home, where they made up their cartridges in the manner described. One third of July two Polish boys and myself attempted to celebrate the Fourth a day in advance. One of the boys, whose father had gone to work, secured about 5 lb. of powder from the keg at home, and we proceeded to celebrate, with the result that one of the boys lost his leg while the other was badly burned and disfigured for life.

In this connection I am reminded of a sad spectacle observed but yesterday while walking on the street in Wilkes-Barre. Two blind men accosted me, appealing for aid. From the powder marks on their faces I knew they were miners and, in response to my inquiry, each told me he had lost his sight when making up a cartridge of powder. Why will not miners learn care and caution in this regard, and save themselves a life of misery?

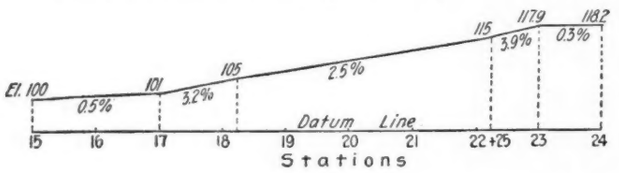
Kingston, Penn. F. B. H.

Inquiries of General Interest

Self-Acting Incline

We have under consideration, at our mine, the adoption of a gravity-plane haulage between two partings 900 ft. apart on the main road. From Sta. 24 on the inside parting to Sta. 15 on the next parting outby there is a variable grade in favor of the loaded cars.

As shown in the accompanying profile, starting from Sta. 15, the road rises 1 ft. to Sta. 17, giving a grade of 0.5 per cent. From Sta. 17 to Sta. 18 + 25, the rise is 4 ft., grade 3.2 per cent. From Sta. 18 + 25 to Sta. 22 + 25, the rise is 10 ft., grade 2.5 per cent. From



Sta. 22 + 25 to Sta. 23, the rise is 2.9 ft.; grade, 3.9 per cent. Finally, from Sta. 23 to Sta. 24, the rise is 0.3 ft., grade, 0.3 per cent.

The mine cars weigh, on an average, 1200 lb. and have a capacity of 2400 lb. of coal, making the weight of the loaded car 3600 lb. I want to ask if it is possible or practicable to attempt to operate a self-acting incline on this stretch of road shown in the profile.

A. S. WHITE.
Whiteburg, Iowa. Mine Engineer.

In a self-acting incline, the number of loaded cars must always equal the number of empty cars, and the weight of the cars balance each other. The weight of the coal in the loaded cars descending the incline must produce a gravity pull sufficient to overcome the gravity pull of the rope lying on the incline and the friction pull of the entire moving system, which includes the loaded and empty cars and the rope. Or, expressed in other words, the gravity pull less the friction pull due to the weight of the coal hauled cannot be less but must always be greater than the gravity pull of the rope lying on the incline, plus the friction pull due to the combined weight of the cars and the rope.

In the present case, it will appear from the profile that the general grade of the incline may be taken as, approximately, 2.5 per cent., expressed decimally 0.025, which is the gravity factor. The factor representing the friction pull of the entire moving load is determined by assuming a track resistance of, say 30 lb. per ton, which expressed decimally is 0.015.

Now, in order to ascertain the force producing motion, the weight of coal hauled in a trip of n cars ($2400n$) is multiplied by the difference between the gravity and friction factors ($0.025 - 0.015 = 0.01$); thus, $2400n \times 0.01 = 24n$, which expresses the force producing motion.

To ascertain the forces resisting motion, assume that a ¾-in. steel rope, 900 ft. long, weighs approximately 1000 lb. Then, multiplying this weight by the gravity factor gives, for the gravity pull of the rope lying on the incline, $1000 \times 0.025 = 25$ lb. To this must be added the friction pull due to the weight of the entire moving load, exclusive of the coal. The number of cars being $2n$, their weight plus the weight of the rope is $2n \times 1200 + 1000 = 2400n + 1000$. Multiplying this by the friction factor gives, for the friction pull resisting motion $(2400n + 1000)0.015 = 36n + 15$. This makes the combined forces resisting motion, $36n + 15 + 25 = 36n + 40$.

It is quite evident, therefore, that the forces resisting motion here far exceed the force producing motion, and the self-acting incline can not be made operative.

Working Contiguous Pitching Seams

We are about to drive a tunnel to tap two veins of coal that pitch from 60 to 75 deg. As indicated in the accompanying figure, the thickness of the first or overlying seam is 9 ft. 6 in., while the second seam underlying the first is 4 ft. thick. The two seams are separated by a slate parting having an average thickness of 6 ft. 6 in. This comparatively thin parting makes it necessary to work the two seams practically as one.

The question of handling the slate and working these two seams to the best advantage is a difficult one, and I would very much like to see it discussed in *Coal Age*. Drill-hole records show that the lower 4-ft. coal is very hard, while the thicker overlying seam is not so hard and will probably work more freely. We are anxious to adopt such a method of mining as will provide the largest possible recovery of the coal in the two seams.

Although the slate parting appears to be of medium hardness, it would be well to consider two cases in this respect—one in which the slate is hard enough to stand up well while the coal is being taken out, and another where the slate is weak and falls readily. I shall be glad to have the suggestions of practical men who have had experience in mining coal under conditions similar to those described.

JOSEPH D. LEWIS.
Shenandoah, Penn. Mining Engineer.

We hope there will be many answers to this question, which is one that must be considered carefully in relation to the economy of working and securing a maximum extraction of coal, having due regard to safety. Answers should be accompanied by sketches showing the general plan of working.

Assuming that the coal in both of these seams is of good quality, it is important to devise some safe and economical method that would enable the coal to be taken out with the least expense for deadwork in the handling of the slate. Let there be a good discussion of this question by the many practical readers of *Coal Age*.

Examination Questions

Alabama First-Class Examination Held Jan. 22-25, 1917

(*Selected Questions*)

Ques.—In what part of a mine may gas be expected to be given off more freely than in other parts, and why?

Ans.—Gas is generated more freely in the new workings of a mine where the coal seam or adjoining strata give off gas. The reason is that, as time goes on, the continued draining of the gas from the strata reduces the pressure under which it is confined, and the generation is less rapid the longer the surfaces remain exposed.

Gas may also be expected to be given off more freely in the vicinity of large abandoned areas where it has accumulated. The issuing of gas from such abandoned places is due to the expansion of the gas and air following a fall in barometric pressure. It may also result from a fall of roof, which drives out the gas from those places into other portions of the mine.

Ques.—What proportion of firedamp in an air current forms an explosive mixture of the least dangerous character?

Ans.—A firedamp mixture that is above the maximum explosive point or, in other words, contains a larger proportion of gas to air than 1:9.5, which marks the maximum explosive point of pure marsh gas and air.

For example, if a firedamp mixture contains 1 vol. of gas to 8 vol. of air, or 1 vol. of gas to 7 vol. of air, any further addition of air, which is liable to occur at any time in the mine, would cause the mixture to become more explosive or to approach the maximum explosive point. On the other hand, a firedamp mixture that is below the maximum explosive point is less dangerous, because any addition of air to such mixture will render it less explosive.

Ques.—If a mine of which you had charge were to suddenly develop firedamp, what would you consider your duty, according to the mine law?

Ans.—Assuming that the mine is worked with open lights, immediate steps should be taken to notify the men working in all sections of the mine to extinguish their lights at once and withdraw promptly from the mine. As far as possible, safety lamps and electric mine lamps should be employed to give light to the men and enable them to find their way out. Assuming, however, that the mine is worked with safety lamps exclusively and that the firedamp is given off in sufficient quantity to render the workings dangerous, the men should be notified to withdraw promptly and as quietly as possible. Word should be sent to the surface to speed up the fan and increase the circulation in the mine. The firebosses should then devote their attention to directing the circulation in such a manner as to sweep out the gases generated and prevent their accumulation in the workings. When the situation is well in hand, particular care must be taken in the examination of every portion of the mine before the men are again permitted to enter for work.

Ques.—If suddenly you found yourself in an explosive mixture of air and gas, state briefly what you would do to avoid accident.

Ans.—It is important to keep cool, make no quick motion, but lower the light cautiously and promptly. If the lamp is filled with flame, it should be carefully shielded or smothered under the coat, while withdrawing toward fresh air.

Ques.—In making the weekly examinations of old workings where gas has been discovered, what observations should be made to guard against accident? How should the report be made?

Ans.—Where gas has been discovered in the old workings of a mine, particular attention must be paid to ascertain the quantity of gas present and, if possible, devise some means of ventilating the place so as to clear away the accumulation. It is important, also, to note the condition of the roof, in order to guard against a possible heavy roof fall that might drive out the gas into other sections of the mine. The quantity of air passing through the old workings should be carefully measured. All of these observations must be entered in the report book, which should be made to show the conditions each week.

Ques.—What, in your opinion, is a miner's first duty on entering his working place in the morning? Who should have preceded him there according to the law?

Ans.—The first duty of a miner when entering his place in the morning is to examine the roof carefully to ascertain its condition and to set any timber that may be needed to make it secure. The miner should also examine closely the coal face to see if there is any portion of it that may tend to fall. He should take down any loose top that he may find or make it secure with timber. This must be done before starting to do any other work. The fireboss should have always preceded the miner, in making his morning examination of the mine, and the miner must observe if the fireboss has left his mark at the face of the coal, showing that the examination has been made that morning.

Ques.—Suppose just before making your regular inspection of the mine you discovered that a door had accidentally been left open, thus destroying the ventilation of the mine, say how you would proceed to make your inspection.

Ans.—Assuming that there are no men at work in the mine, the fireboss should at once close the door, and, giving a little time for the air current to reëstablish itself, he should proceed to examine each place in succession, beginning with the first place on the intake and following the air current in its course throughout the mine or section to be examined. More than usual attention should be given in the examination of each place to ascertain that there is no gas accumulated in the waste or other void places. When making out the report of the examination, the fact should be noted that the door was found opened before the examination was commenced.

Coal and Coke News

Washington, D. C.

Despite the success which has attended the electrification of the Chicago, Milwaukee & St. Paul R.R. for 400 mi. in Montana, the extension of the use of this power in the Northwest and on the Pacific slope will be slow. This is the opinion of government specialists who have just completed a study of the relative use of coal, fuel oil and water power in the sections mentioned. Any development that may be reached in the waterpower industry for many years to come is likely to have little effect on the development of the coal industry, it is believed. While there is considerable uncertainty as to the future expansion of the coal production of the West, it is apparent that the region, generally speaking, will be able to absorb any possible increases in production.

The fact that the coal mines are owned in many cases by the railroads is certain to have an important bearing, the specialists believe, on the retardation of electrification. The principal users of fuel, in the West, are railroads, steamship lines, smelters, cement plants and power plants at mines. To these consumers must be added the rapidly increasing domestic and industrial demand. The use of coal for heating purposes apparently is increasing more rapidly than is the population.

Industrial development has been marked during the last year. Many of the new manufacturing establishments are not situated so as to secure electric power economically and the price of fuel oil has risen to a point that gives coal a considerable advantage in most parts of the West. The oil development in Wyoming, however, is said to be exerting an important bearing on the fuel situation in that state, in Colorado and the territory directly tributary to the Wyoming centers of production.

Anticipating passage by Congress of legislation calling for more stringent regulation for the handling of explosives, the Bureau of Mines is making a study of the British Explosive Act and the laws of other foreign countries pertaining to the subject. The British Act became a law in 1875. Since it has withstood the tests of more than 40 years, careful consideration will be given this law in the formulation of the Federal regulation. When the success of this legislation is assured, it is probable that representatives of manufacturers, distributors and users of explosives will be called upon to assist in working out regulations which will impose hardships on none and will make it more difficult for the criminally inclined to secure explosives.

The national capital is being flooded with suggestions as to the means of conducting and financing the war. Obeying instructions from the Wisconsin legislature, some of the suggestions of that body have been laid before Congress. Among various other things, it is proposed that the Federal government take over immediately all mines and oil fields and operate them without profit. The administration of this task is assigned to the Bureau of Mines by the Wisconsin lawmakers.

Pretentious Work of the Geological Survey

Results of the most pretentious work ever done by the Geological Survey on coal will be apparent within the next few days when Marius R. Campbell's report on the coal fields of the United States will be ready for distribution. The report is published as professional paper 100 and is accompanied by a large wall map. The map is 82 by 51 in. in size and shows in distinctive colors all deposits of coal. Anthracite, semi-bituminous, high-grade bituminous, low-grade bituminous, subbituminous, lignite and coking coal are shown in distinctive markings. Shades of color differentiate between areas known to contain coal beds of commercial value and areas of doubtful value for coal. Still another shade shows that the coal-bearing formations are under considerable surface covering.

The very first copy of the completed map was struck off for the use of the committee on coal production. It can be seen on the wall behind the fuel board in the photograph which appeared in "Coal Age" of May 12.

Mr. Campbell's report on coal represents a number of years' work with the advantage of accumulated information possessed by the Geological Survey. The work is an effort of the Survey to take stock of the country's fuel and to determine the quantity, quality and geographic distribution of the coal still in the ground and available for future use.

Senator Gore's recent effort to get his bill (S. 2263), providing means for conserving foods, feeds and fuels, before the Senate has given rise to a demand that the bill be limited to foodstuffs. Since the administration of the provisions of the measure are vested in the Department of Agriculture, it is held that that department is not equipped to handle questions pertaining to fuel.

Miners' rescue appliances, miners' safety lamps and parts thereof are included in an amendment of Representative Graham, of Illinois, as fit articles to be exempted from the 10 per cent. ad valorem duty provided in the revenue bill.

Bureau of Mines Map

In order to systematize its mine-rescue work, the Bureau of Mines has divided the United States into nine districts. These districts are designated by letters of the alphabet on a new map issued by the Bureau. Mine safety stations are shown by circles. Headquarters of mine safety cars are indicated by the figure of a car. Triangles show the locations of experiment stations.

Instead of confining the use of the mine safety cars to rescue work, the Bureau now is making use of these cars in the dissemination of information intended to be helpful to mine operators and mine workmen. The cars are seldom at headquarters. They are kept in motion and visits are made to as many mining camps as possible. Lectures are delivered from the car platform. Moving pictures are shown from the same point of vantage. In this way whole mining communities are given an opportunity to acquire information likely to be helpful in the increase of safety and in bettering mining practices of all kinds.

The services of the mining engineer in charge of the car and his staff always are offered free to the operators. In case the operator desires it, a survey will be made of the mine with the object of suggesting improvements. While these suggestions for the most part are confined to safety and sanitary conditions, no opportunity is lost to call attention to any matter likely to be of benefit to the operator or to the workman.

The Bureau of Mines now has in its service eight excellently equipped cars. Three of these are of all steel construction and just have been placed in service. The five other cars have been recently overhauled and remodeled. The Sundry Civil bill provides for three additional cars for the fiscal year of 1917-1918.

Railroads to Haul More Coal

That the railroads will haul 26,000,000 tons of coal to the Lakes for trans-shipment to the Northwest during the 180 days of the navigable season and that 36,000,000 tons of ore will be moved in the same time from Lake Erie ports to inland furnaces was an estimate made May 21 by Fairfax Harrison, president of the Southern Ry. system and chairman of the War Board of the American Railway Association. Continuing, Mr. Harrison said:

"As part of the efforts being made in all directions to increase the capacity of the existing railroad facilities of the country, that they may better meet the present national emergency, arrangements have been made by shippers and railroads whereby all coal for shipment on the Great Lakes through Lake Erie ports will be 'pooled.' It is expected that this will effect such a saving in the time of freight cars that it will be practically equivalent to adding 52,000 cars to the available freight equipment of the railroads.

The practice heretofore has been for each individual shipper to send his coal to some Lake Erie port, and there gradually accumulate enough for a full shipload. In the meantime, the cars were held up, and, due to the numerous grades of coal handled in this way, much switching was necessary. Under the 'pooling' arrangement coal owned by different producers will, on arrival at a Lake port, be put in a common 'pool,' and dispatched to the Northwest as fast as steamers are ready to take it. The 'pooling' plan will necessitate a large reduction in the number of grades of coal handled. It is thought that the new arrangement will effect a saving of one and a half days in the time of each car that carries coal to Lake Erie ports."

HARRISBURG, PENN.

Upholding a Referee and the Workmen's Compensation Board, President Judge H. M. Edwards has dismissed the appeal in the case of Adam Faggiani vs. the Temple Coal Co., appellant. This is the first decision of courts in Lackawanna County in an appeal from the workmen's compensation board. Two other similar cases are pending before the court.

Faggiani, a resident of Jessup, was employed as a laborer by the defendant company, and in the course of his employment received an injury to his left eye. The referee awarded him $6.74 a week until the amount of $842.50 should be paid. The company, while admitting that Faggiani was injured in the course of his employment, denied its liability on the ground that the claimant had refused to submit to an operation that would possibly have restored his sight. On these grounds they attacked the conclusions of law.

The State Department of Forestry has announced that organization of the forest protective association for the hard coal region has been completed, and application has been made to the chief Forest Fire Warden for a form of charter.

The following officers have been elected: President, H. C. Mason, of the Lehigh & Wilkes-Barre Coal Co., vice president, A. C. Neumiller, forester for the Lehigh Coal and Navigation Co.; secretary-treasurer, H. C. Weimer, forester for the Lehigh Valley Coal Co.; Directors: H. B. Fell, of the Wyoming Valley Water Co., L. W. Conrad, of the Philadelphia & Reading Coal and Iron Co., H. A. Christian, of the New Jersey Zinc Co., E. A. Pettebone, of the Delaware & Hudson Co., James Archbald, Girard Estate, P. W. Lance, of the Spring Water Co.

The charter will be modeled after the one under which a similar association is now operating in the Poconos. The association will operate over about 500,000 acres of forest land, covering practically all of the anthracite region between the Susquehanna and the Schuylkill rivers.

Conference of the joint mines and mining committee during the week, with members of the former Tener Mine Cave Commission, developed the most interesting of the many sessions on mine cave legislation. It brought to the capitol in addition to the legislators and the members of the commission, the presidents of the United Mine Workers, high officials of the leading coal companies and their attorneys and many prominent citizens from the hard coal regions.

W. L. Connell spoke on behalf of the operators, urging that the Scarlet bill would stifle the anthracite industry. "Our mines would stop the day after the Governor signs the bill," he said. He advised against hasty action, urging that the Tener commission be recreated to consult during the next two years with a legislative committee and to report to the next session of the legislature.

The Committee agreed to report out the Scarlet bill and the Ramsey bill, to provide different procedure to solve the problem confronting the anthracite region, so that the legislature can consider at the same time, which bill should be accepted by the House as the better solution.

Appointment of a joint investigating committee to look more fully into the charges recently made by the United Mine Workers against James E. Roderick, chief of the department of mines, that he is holding up a number of certificates of applicants for mine foremen and assistant mine formen, and for which mandamus proceedings have been entered in the Dauphin County court, is provided in a resolution presented in the senate by Senator James P. McNichol of Philadelphia.

The resolution provides for the naming of three members of the senate, to be appointed by the president pro tempore, and four members of the house, appointed by the speaker.

The joint committee so provided would be directed to organize, to hold meetings, summon witnesses, administer oaths and subpoena records, books and papers. After investigation the committee is to report on the methods employed in issuing and refusing to issue mine foremen's and assistant mine foremen's certificates.

The resolution cites particularly the charges recently made in newspapers and by Attorney Roger Devers, for the United Mine Workers, that the chief of the Department arbitrarily refused to issue certificates to 40 applicants who had successfully passed the required examination.

The chief of the department of mines at that time contended that the men should have taken the examinations in the districts in which they are employed, which has been a ruling of the department for many years, and that he had been advised that it was within his jurisdiction to hold up the certificates. It is thought by many at the Capitol that the resolution has been introduced for political purposes.

Reduction in fatal accidents in the coal regions are reported for April by Chief James E. Roderick, of the State Department of Mines. In a statement recently issued he says that last month there were "in the bituminous region 31 fatal accidents as compared with 36 in April, 1916, and in the anthracite region, 36 as compared with 39 in 1916.

PENNSYLVANIA

Anthracite

Lansford—The Lehigh Coal & Navigation Co. has commenced the erection of a new washery for handling drifted coal in the Lehigh Canal near Lehigh Gap, to cost about $20,000.

Hazleton—Effective Jan. 1, 1918, the Mill Creek Coal Co. will take over and operate the Morea coal properties now worked by the C. M. Dodson Coal Co. The lease of the latter company expires at this time.

Carbondale—Property owners on the No. 4 road are greatly interested in a project of one of the leading coal companies to buy land in that section. It is stated that a large amount of coal is beneath the surface, and this is the reason that the company is anxious to purchase the property. It is stated that practically all of the property owners own the mineral rights and since the report has been circulated that the properties contain mineral they are reluctant to sell their holdings.

Wilkes-Barre—Removal of the coal, the principal taxable wealth of Luzerne County, is beginning to show a marked loss in the total county valuation subject to taxation. The new valuation for 1917, just completed by the Board of assessors, reveals a decrease of $4,604,934 from the valuation of 1916. This loss is due to the removal of coal during the last year. About 54 per cent. of the county values for taxation is coal land, so that as the coal is taken out the value of coal property decreases. These decreases have begun to be noted during the last three years, but have been previously overcome by natural increase in surface valuation and the higher values placed on coal.

Scranton—Eight mine workers at the Diamond mine of the Delaware, Lackawanna & Western, Coal Department, had a close call on May 14, when something went wrong with the guide ropes and the mine carriage they were riding on dropped. However, the "dogs" gripped the wooden sides of the shaft and prevented the cage from going to the bottom.

Plymouth—The narrow gauge railroad from the Boston to No. 5 Delaware & Hudson breaker overland is rapidly nearing completion and that from No. 3 mine to the same breaker has been finished for some time. With coal from Nos. 2 and 4 mines going underground to No. 5 breaker and that from Boston and No. 3 overland, No. 5 breaker of this company has developed into one of the largest coal producing plants in the Wyoming Valley.

Bituminous

Pittsburgh—The City Council has adopted resolutions to provide for the mining of coal by the city at Highland Park, Schenley Park, Junction Hollow, and other sections. An appropriation of $2000 has been made for drilling test holes and authority given for the employment of a mining engineer to conduct the work. It is planned to dispose of the product from Junction Hollow to private consumers at cost, and to utilize the coal from Highland Park for the city pumping station. It is also planned to purchase steel hopper cars with capacity of about 50 tons each to facilitate operations.

The Pennsylvania Railroad Co. has asked for bids on an extension of the Ten Mile Branch of the Monongahela division from Bosco to Jefferson in Green County. This new section will form a part of the proposed connecting link between Waynesburg and the Monongahela River. The new road will cost in the neighborhood of $1,000,000 and will open up an extensive coal field in this section of the country.

Connelsville—At the examination for mine foremen and firebosses, held here recently by the examining board of the Ninth district, it has been announced that the following classes passed: 9 first grade mine foremen; 14 assistant mine foremen and 15 firebosses.

The coke production and shipments from the Connellsville region fell off recently on account of a poor car supply. The total amount shipped by rail and river amounted to 378,890 tons, the production being 380,530 tons. This was a decrease of 19,507 tons of production from the preceding week, and in shipments of 39,112 tons.

Uniontown—The Hill interests of the Northern Pacific R.R., it is stated have acquired the coal holdings of J. V. Thompson in western Pennsylvania and West Virginia. Thousands of acres of coal land figure in this deal. Members of the Thompson creditors' committee closed the deal in St. Paul with Louis W. Hill, Frank A. Chamberlain, Watson F. Davidson, and others.

Indiana—The new operations of James Pierpont & Co., at Locust, Indiana County, have now reached a large daily production. The first drifts proved faulty but others were opened up the ravine and have proved to be in excellent coal. A modern tipple, ten miners' houses and other buildings have been completed. Mr. James Pierpont, president of the company, has personally supervised all construction and opening work.

The oral examination held in connection with the recent written tests for mine foremen and firebosses was held here recently. All passing the written tests were eligible for the oral and without a single exception all passed successfully.

Huntingdon—Judge Bailey, President Judge of Huntingdon County, has just issued a verdict that miners in the Broad Top coal region cannot mine coal by "bumping" it, except with the permission of the mine foreman. "Bumping" is a Broad Top term used to describe an operation similar to shooting from the solid. There is only a slight difference consisting in a slight shearing or cut across the face of the room or entry. This practice was brought to the attention of the court by the state mine inspector of the district.

Millsboro—The Besco mine near here which has undergone extensive improvements in the last few months has resumed active mining operations. A new tipple was constructed, new electrical machinery installed as well as other improvements. There are about 275 coke ovens at the plant but it is stated that they will not be put into operation at the present time. The owner is the Champion Gas Coal Co.

Chambersville—It is understood here that an interest in the Kinter mine has been sold to Indiana capitalists and that an effort will be made to get sidings in connection with the B. R. & P. Ry. The mine was opened during the past winter for country trade and is so close to the creek that it is difficult to obtain a railroad connection.

Waynesburg—The Poland Coke Co. has completed the new tipple, power house, and other improvements made on the Provance farm on Dunkard Creek and now has placed them in operation.

WEST VIRGINIA

Charleston—The fatality report of the state department of mines for April showed a total of 33 persons killed in and about West Virginia coal mines. Of these 13 fatalities were due to falls of roof and coal, six to mine-car accidents, three to motors, five to an external powder explosion, and two to mine cars outside the mine, one to a motor accident outside the mine, and one each to a mining machine, a local gas explosion, and an inside explosion. Eleven of the fatalities occurred in McDowell County.

Under a law recently passed by both houses of the Legislature, every able-bodied citizen of West Virginia between the ages of 16 and 60 must work at least 36 hours per week. This measure includes persons having income, and no specified employment, and will become operative in 30 days. Penalty for violation is forced employment by counties or municipalities. This bill has been urged as a war measure.

A special Grand Jury in the course of a recent investigation found that coal operators of West Virginia, Ohio, Pennsylvania, Kentucky and Indiana have not violated the Sherman anti-trust law in the maintenance of coal associations for their mutual benefit. It had been charged that the operators had conspired to eliminate competition and control the price of fuel in violation of the freedom of interstate commerce.

Fairmont—Erection work on the tipples and top equipment of the Ida May and Marolina mines of the Consolidation Coal Co. is expected to be finished within 30 days. Soon afterward it is hoped to have coal coming from the new openings. The hoisting motors and the greater part of the tipple equipment have been already installed.

Piney—The Piney Pocohontas Coal Co. has acquired large local coal properties and is arranging for early operations.

ALABAMA

Birmingham—Estimates made at the office of the chief state mine inspector are to the effect that 6,500,000 tons of coal have been mined during the present year in Alabama. It is said that this pace will be bettered during the balance of the year, despite the fact that the railroad service at the present time is poor and labor is short. The total output of coal mines for the year will be approximately 22,000,000 tons, it is anticipated. This compares with 18,250,000 tons in 1917.

Erskine Ramsay, southern member of the sub-committee of the Council of National Defense, to supervise coal production of the nation, has appointed the following coal men to assist him in handling the situation in the southern coal fields: M. W. Bush, president of the Imperial and Majestic coal companies, Birmingham; George F. Peter, president Climax Coal Co. and Southern Coal and Coke Co., Maylene, Ala.; Jas. L. Davidson, secretary, Ala. Coal Operators Association, Birminghom; E. L. Hampton, president, Tennessee Consolidated Coal Co., Tracy City, Tenn.; E. C. Mahan, president Southern Coal and Coke Co., Knoxville, Tenn. A meeting of the sub-committee has been called and will hold a session at an early date in this city to map out its work.

KENTUCKY

Pineville—General offices have been opened here by Jouett, Biglow & Brooks, whose operations embrace the Paige-Jellico Coal Co., at Ely; the Pine Ridge Coal Mining Co., the Jaybee Jellico Coal Co., the J. B. Blue Gem Coal Co., at Hosmar; the Varilla Mining Co., at Varilla, and an operation in the Stony Fork field near Middlesboro. The local office will be in charge of Jack Bradley, who has general supervision of the mines.

Madisonville—Eastern capitalists have had representatives inspecting coal properties hereabouts and it is reported that holdings in Webster and Union counties are to be sold. The Bell vein of coal is getting most attention, it is said.

Island—The mines of the E. M. T. Coal Co. here have been leased to Chicago parties for a term of 16 years, at a consideration said to be $15,000 cash and liberal annual royalties. D. C. Edwards and L. B. McHargue, London, Ky., and H. C. Thompson, of Winchester, Ky., are principal owners.

Middlesboro—Wade Gibson, truck gardener, operating a truck garden of 19 acres, has discovered a 36-in. bed of high grade coal under his truck patch and will begin operations at once.

Fleming—The Elk Horn Mining Corporation announces that a considerable improvement is noted in the labor situation within the recent past in the plants at Fleming, Haymond and Hemphill. Several large transportations have arrived within the past few days. Practically all the men that can be used are now on hand.

Whitesburg—Carl K. Goodson and others of Windrock, Tenn., have been in the coal fields surrounding this city looking over available coal lands for lease. It is expected that a lease will be closed within the next few days for early development.

OHIO

Columbus—M. J. Camples, of the Hocking Valley and Chesapeake & Ohio railroads has announced that by July the connection between the C. & O. at Sciotoville and the Norfolk & Western at Waverly, O., will be completed and coal trains will be run directly from the West Virginia fields to the lakes. This will go far toward facilitating the movement of coal. The road, which is about 33 mi. in length, including a large railroad bridge over the Ohio River at Sciotoville, will cost about $4,500,000.

INDIANA

Indianapolis—Governor Goodrich and a Legislative Committee have been making a tour of strip mining fields examining properties which the owners have offered for sale to the state, which proposes to buy a coal mine and go into the mining business to produce fuel for supplying the state's institutions. The Globe Coal Co. has offered the state a strip mine in Clay County at $225,000. It is the Governor's idea that a strip mine be bought so that the state's penal labor can be employed without running counter to the union regulations. The state's institutions require about 150,000 tons annually and several of them ran short last winter. Bids for supplies offered have been around $3 a ton, it is stated.

ILLINOIS

Herrin—The Burlington R.R. broke all records for 3 days recently in moving 1607 cars of coal out from the 18 mines that bill from this station. A week's shipping from the Burlington mines here approximated 3500 cars, which breaks all records for one week's movement from any road in the southern Illinois coal field.

An intoxicated miner is blamed for the wrecking of the main shaft of the C. & H. mine through the placing of a loaded pit car on the cage so that one end of the car extended over. When the cage was hoisted the entire shaft was wrecked, necessitating a suspension of several days.

Christopher—The two mines here of C. M. Moderwell & Co. of Chicago, producing Christopher coal, this week passed into possession of the Old Ben Mining Corporation of Chicago. This gives the new owners possession of the four Christopher mines and the two big mines at West Frankfort. It has now the 6 largest producing mines in the southern Illinois field.

Edwardsville—The Beck White Coal Co., controlled by the St. Louis Coal Co. of St. Louis, Mo., has bought the old Henrietta mine here and is rushing improvements for an early re-opening. The mine has been closed two years.

Benton—Interests headed by the Edwards & Bradford Lumber Co. of Chicago and J. M. Seymour of this city are sinking a new mine southeast of town and west of the Middle Forks mine. A large acreage has been secured, and this will be when completed the most up-to-date mine in the state.

Duquoin—Miners in this district received during the past week their first pay since the last increase in wages was granted. The increase amounts to approximately $40,000 a month in this city. In the southern Illinois coal field the increase is about $500,000 a month.

Marion—The Schott interests of Chicago, holding franchises for an interurban line to connect Marion, Harrisburg, West Frankfort, Benton and other towns in the southern Illinois coal field, have suspended operations for 90 days on ac-

count of the difficulty of obtaining equipment at this time. The new line between Carbondale and Murphysboro will be in operation July 1.

Springfield—A resolution has been introduced in the Illinois Legislature in favor of the state building a canal from the Big Muddy River to the Mississippi River in southern Illinois, so as to provide an all-water route from that field to Chicago by way of the Mississippi and Illinois rivers and the drainage canal. It has been referred to the waterways committee.

Edwardsville—Arrangements are being made to reopen the old Henrietta mine here, which was abandoned four years ago. J. T. Snyder and others have taken hold of the old property, discharged certain obligations against it and will clear out the old shafts and put a large force at work in the deserted operation.

COLORADO

Eldora—The entire surface plant of the coal mine here was recently destroyed by fire. The origin of this fire is unknown, but it is believed to have been of incendiary origin. The mine belongs to the National Fuel Co., and reconstruction will commence as soon as possible.

Personals

J. H. Warmoth, Chicago sales manager for the St. Louis Coal Co., has severed his connection there to go with the Rutledge & Taylor Coal Co. at St. Louis.

W. L. A. Johnson, commissioner of the Southwestern Interstate Coal Operators' Association, is again at his desk, though not fully recovered from recent illness.

A. M. Neumiller, chief forrester for the Lehigh Coal and Navigation Co., Lansford, Penn., has been elected vice president of the Anthracite Protective Forestry Association.

W. R. Crowthers, formerly with the Cleveland & Western Coal Co., has been made resident manager in Pittsburgh of the Weaver Coal Co. of Buffalo, with office in the Oliver Building.

Harry D. Nesbit, for several years past Chicago sales manager for the Southern Coal, Coke and Mining Co. of St. Louis, has resigned to associate himself with the Platt & Brahm Coal Co. of Chicago.

J. W. Galloway has been elected president of the Maryland Coal Co., Grafton, W. Va. Other officials appointed are: George Hewlett, first vice president; Gordon Smith, second vice president; J. E. McGowan, secretary and treasurer; and H. S. Rodgers, assistant secretary and treasurer.

Frederick C. Baird, of Pittsburgh, Penn., general freight traffic manager of the Bessemer & Lake Erie R.R., will be the commissioner of the new coal pool being formed to regulate Lake shipments of coal passing through all Lake Erie ports. Mr. Baird will make his headquarters at Cleveland.

John Hammond has resigned his position as private mine inspector for the Ebensburg Coal Co. at Colver to accept the superintendency of the new Marion Center mine of the Emmons Coal Mining Co. at Marion Center, Penn. Mr. Hammond was formerly connected with the Wharton Coal and Coke Co. at Coral, Penn.

F. Quattrone, chief engineer of the Italian State railways, returned to the United States a few days ago. He has returned after some months' absence, as a special delegate of the Italian Government as well as of the Italian State railways, to be attached to the Italian Embassy at Washington, and will have in charge the purchase and shipment of all materials to be contracted for by the Italian Government.

Obituary

Gilbert T. Rafferty, who was prominent in coal and coke circles several years ago and was formerly president of the McClure Coke Co., died on May 8, after a long illness. Mr. Rafferty while in Pennsylvania was prominent in politics and was a candidate for Congress in 1886. He was a delegate to the first national convention that nominated Grover Cleveland, for President. He is survived by his widow, five sons and three daughters. Mr. Rafferty traveled extensively and had homes in Pittsburgh, New York and Alexandria Bay, N. Y.

Industrial News

Drifton, Penn.—The Lehigh Valley Coal Co. has advanced the wages of its local unorganized shop employees 35c. a day, effective May 1.

Memphis, Tenn.—The Memphis Freight Bureau will oppose the 15 per cent. advance in freight rates so far as it applies to coal rates into Memphis.

Philadelphia, Penn.—The Orr Coal Mining Co., Wilsonburg, W. Va., is arranging for the establishment of an office in the Land Title Building. H. G. Antone will be in charge.

Hempfield, Penn.—F. B. Cook, of Johnstown, has closed a deal with the Scottdale Coal and Coke Co. for its holdings of 134 acres of coal and 108 acres of surface for the consideration of $49,096.

Paterson, N. J.—The Board of Public Works has adopted a resolution allowing local mills with stacks at least 50 ft. above the street level, to use bituminous coal on account of the present anthracite shortage.

Pittston, Penn.—In appreciation of his services to them, the members of the mining class of the Pittston Y. M. C. A. recently gave a dinner to Robert Bowen, of Plainsville, teacher of the class, and presented him with a sectional bookcase.

Columbus, Ohio—The Columbus offices of the George M. Jones Coal Co. have been moved from the fifth floor to rooms 403 and 404 of the Huntington National Bank Building. The new offices give additional space, which was badly needed.

Pittsburgh, Penn.—The Asbestos Protected Metal Co., of Pittsburgh, recently announced the appointment of Stanley L. Rau as sub-agent for Grand Rapids and vicinity, working in connection with the Detroit office. Mr. Rau will be located in the Powers Theater Building.

Cleveland, Ohio—A verdict of not guilty was returned recently against ten officials of several Cleveland retail coal companies who were tried on indictments charging them with having entered a conspiracy to fix and maintain coal prices in violation of the Valentine anti-trust law.

Owensboro, Ky.—Mayor Hickman, who last winter went into the retail coal business, buying coal for sale at cost to the poor consumers, is again in the field. The first carload he was able to get was booked up at once on a basis of 8½c. a bushel under the prevailing retail price.

St. Louis, Mo.—At a meeting of the Board of Directors of the Walter A. Zelnicker Supply Co., held on Apr. 19, A. R. Topping was elected secretary of the company. Mr. Topping has been associated with this company for the past 11 years, and his advancement has been rapid.

Pittsburgh, Penn.—Randolph-Means Co., consulting engineers, is in charge of the extensive improvements being made in the Pardee, Sydnor and Cartwright mines of the George M. Jones interests, Huntington, W. Va. These mines are to be electrically equipped throughout and when completed will be among the best in West Virginia.

Morgantown, W. Va.—The Davis Fuel Co. has opened offices at Morgantown, W. Va., for buying and selling Connellsville coke, West Virginia byproduct steam and gas coal. The location selected has the advantage of placing this company in a position to handle both the product from the Connellsville region, and that from the Fairmont district.

Columbus, Ohio—Local coal operators have been notified that the George M. Jones interests of Columbus and Toledo, operating under the charter of the Cambria Collieries Co., have taken over the properties of the Cambria Mining Co., the Toledo Mining Co. and the Ohio River & Western Coal Co. The transaction involves $3,000,000 and 2000 acres of land.

Pittston, Penn.—Following up its cancellation of all excursions because these draw miners from their work at the time when the nation needs the maximum output of coal, the Lehigh Valley R.R. has refused to permit circuses to use the customary field in Pittston this year for the same reason. Those scheduled to show in this town have cancelled their engagements.

Johnstown, Penn.—It is stated from reliable sources that a deal is pending by which the holdings of the Binder Coal Co., in northern Cambria County, will be sold to an Eastern syndicate. It is known that the Carrolltown plant of the Binder company has been bought by Eastern capitalists, but it is now learned that all four of the Binder plants may be sold.

Frankfort, Ky.—The Kentucky State Railroad Commission, replying to the formal application of the Kentucky railroads for a 15 per cent. advance in intra-state rates, has declined to "give aid or encouragement" to the purpose. "If this commission should give aid for encouragement to your demand," the reply says, "we should be as conscience-stricken as if we had given aid to the enemy." The proposed advance involves a flat advance of 15c. a ton on coal and a general advance of 15 per cent.

Cincinnati, Ohio—The United States Circuit Court of Appeals has entered a formal order for the Hocking Valley R.R. to proceed with action looking to the foreclosure of the mortgage securing the bonds of the Sunday Creek Coal Co. This is one of the steps in the Government's suit for the dissolution of the so-called combine, and is intended to bring about the sale of the Sunday Creek properties covered by the mortgage. The foreclosure is not to be had until at least 60 days from the date of the order.

Cincinnati, Ohio—The United States Government has paid to Thomas Oakes, through attorneys at Charleston, W. Va., $240,000, for a tract of 200 acres of rich coal and iron land near the Gauley district, not far from Charleston, which is to be used by the Government as the location for a large steel plant to be erected as soon as possible. The Chesapeake & Ohio Railway Co. will build a spur to the tract at once. The tract has been in the Oakes family for many years, but was not marketable on account of its inaccessibility.

Mahanoy City, Penn.—Although the Lehigh Valley R.R. operates principally in the anthracite belt and carries millions of tons of that fuel annually from the mines of its subsidiary, the Lehigh Valley Coal Co., announcement was recently made that bituminous has been readopted for use on its engines in the fast passenger service over the mountains on the Mahanoy and Hazleton division, because of its superior steam making qualities. The Valley R.R. experimented for some time with a combination of anthracite sizes, but results were not satisfactory.

Dunmore, Penn.—Spruks Brothers and W. Y. Moffatt, have purchased the old Spencer mine. This is one of the oldest in the anthracite region and one of the remaining few, until then, under individual control. While the amount involved in the sale was not made public, it is understood to have been about $100,000. Holdings recently acquired by the Spruks Brothers include the Bull's Head, Carleton and Clearview coal companies, and another mine in the Mid-Valley. The day of the individual mine owner is passing. Probably there are three or four mines in the Lackawanna Valley now owned by individuals.

Columbus, Ohio—In connection with the pooling of Lake trade as the result of the conference of operators held at Washington last week in order to look after the supply of fuel for the Lakes, it is announced that George Cameron of the Pickands-Mather company, of Cleveland, will be the Ohio representative on the committee of operators to work out the details of the pooling arrangements. Mr. Cameron, together with one representative from the operators in West Virginia and another from Pennsylvania, will make up the committee. There are a good many knotty details to be worked out and work will start at once.

St. Louis, Mo.—Preliminary surveys are being made for a railroad line from Edwardsville, Ill., to O'Fallon, Ill., to be part of the Illinois Terminal Railway system. It is understood that the new line is to be extended ultimately to East Carondelet, at an estimated cost of $3,000,000 for the entire line. It will give the Terminal connections with all of the 21 railroads entering St. Louis from the east. The line from Edwardsville to O'Fallon alone will tap 14 roads. The Illinois Terminal now extends from Alton to Edwardsville. It connects with a $250,000 river terminal at Alton. The projected extensions will open up the southern Illinois coal district to the Illinois Terminal.

Frankfort, Ky.—A ruling of the Court of Appeals on the corporation tax question has gone against the Kentia Corporation, of Virginia, which resisted the state board's effort to impose a corporation tax of 30c. on each $1000 of its capital stock, amounting to $10,000,000. The company owns about half a million dollars worth of coal and timber land in Kentucky but is not developing it. The Court of Appeals held that the tax is assessed on the corporate right of the company to do business, not on the property or on business actually done. A new state law increases the corporation tax to 50c. on the $1000.

Tulsa, Okla.—Extensive development of the coal fields in Tulsa, Rogers and other counties in northeastern Oklahoma, is being planned and a number of new companies are being organized here and in other parts of this section to develop the virgin fields. This development is caused by the unusual demand for fuel resulting from increased industrial operations growing out of the war. At present eight mines are in operation in Tulsa County. Drilling for oil in this county has revealed a shallow and a deep bed of coal in nearly every part of the county. The same conditions prevail in Rogers and adjoining counties. Northern and eastern capital has been interested and companies are now being organized to develop several mines in different parts of Tulsa and adjoining counties. Tulsa County mines are being operated day and night, preparing for the heavy demand for coal that will be made when the harvest season in Kansas and Oklahoma opens.

Birmingham, Ala.—H. E. Hutchens, formerly general superintendent of the Southern Ry. in this city, has been appointed by Fairfax Harrison, president of the sub-committee of the Council of National Defense, having charge of railroad transportation problems, to look after the work in this district. Mr. Hutchens will name a committee to assist him in relieving the tense situation in this territory in the handling of coal, coke, iron and other preferential classes of freight.

The Alabama Safety Association has indefinitely postponed the annual field meet which was to have been held June 2. This action was taken in order that there might not be any interruption in coal production at this time, when there is such an urgent demand for every ton that can be mined. It is possible that the meet may be held at a later date.

Market Department

GENERAL REVIEW

Warnings of the Federal Trade Commission and advancing season have beneficial effect on anthracite trade. Sharp advance in bituminous restricts buying. Pooling of Lake shipments expected to materially help the railroad difficulties. Heavy railroad buying in the Middle West and market generally erratic.

Anthracite—The advancing season and the energetic measures of the Federal Trade Commission in running down the instances of exorbitant prices have had a beneficial effect on the market. There is still an urgent demand for all the coal available, but consumers are in a more temperate mood and the general situation is notably easier. Interest is centering more and more on the activities of the Federal Commission, which is rapidly tightening its grip on the anthracite trade in many ways. But in spite of the assurances of the labor leaders that they would make every effort to stimulate greater efforts on the part of the miners, shipments to the distributing centers continue discouragingly light. All sizes are in short supply and show no indication of improving. This is especially the case in New England; deliveries can only be had in that section when substantial premiums are offered, and dealers as a rule do not hesitate to pay these when assured delivery.

Bituminous—There has been a moderate reaction after the spectacular upward swing to the market last week. As is always the case, the very sharp increase in quotations tended to restrict buying, and the slowing up is confined to a decrease in the orders rather than to any important price recessions The sentimental effect of the various statements issued by the Federal Trade Commission has also been a factor in the situation ,though it is difficult to see any reasonable ground for increased optimism. Transportation conditions fail utterly to show any improvement, and the time consumed in the movement to some of the distributing centers is the longest in the history of the trade. Car supply to mines is also hopelesssly inadequate and fails to show any indications of improvement. It is obvious that there will have to be some readjustment in the trade shortly, as some steam consumers who have not been able to increase their profit proportionately to the increase in their fuel billls, such as the public service corporations, for instance, are now sustaining heavy losses. An encouraging development of the week has been the gradual straightening out of the labor difficulties in the Pennsylvania district.

Lake Trade—Interest is centered on the new arrangement for pooling Lake shipments, and it is confidently expected that this will be an important step toward preventing congestion, accelerating the movement and assuring the prompt return of empty cars to the mines. In the meantime delays occasioned by the extraordinary heavy ice have released some tonnage for use at the lower ports, though without any apparent general effect on the market, which continues on practically the same high level reached last week; that the market should touch this level before the beginning of the heavy Lake shipments is certainly a significant indication of what may be expected later. To date the shipments to the upper Lake ports are about 1,000,000 tons behind last season. In contracting it is obvious that buyers cannot risk committing themselves at the current top figures of the season, while operators obviously see no ground for making any concessions on these figures, or even committing themselves at these levels, when there is no indication that this is the top of the market.

Middle West—The market is very nervous and erratic, coal moving in restricted equipment having suffered very sharp declines in some instances, though the general market continues firm. There has been some heavy railroad buying, as, for instance, on the part of the Great Northern R.R., which has been forced into the market to make up the deficiency occasioned by the slow arrivals at the upper ports. One of the dock companies at Duluth, with firm orders on hand aggregating more than 80,000 tons, has so far received less than 20,000 tons, and this is typical of the general situation there. The action of the Federal Trade Commission and especially the Fuel Committee of the National Council of Defense has had a beneficial effect on the car-supply and running time in the Middle Western field has been better than at any time since early March. The bids on the Chicago Board of Education contract running fully double the normal price is evidence of the trend of conditions on business of this character.

A Year Ago—Consumers hesitate to accept the new advanced anthracite circulars. Bituminous quiet but steady. Lake businesss expanding, but labor disturbances are becoming more pressing. Steady demand for steam grades in the Middle West, but domestic sizes in oversuppply.

Comparative Average Coal Prices

The following table gives the range of mine prices in car lots per gross ton (except where otherwise noted) on 12 representative bituminous coals over the past several weeks and the average price of the whole group for each week:

Boston	Year Ago	May 26	May 19
Clearfields	*$1.15@1.60	$5.75@6.50	$5.75@6.50
Cambrias and Somersets	* 1.40@1.75	6.00@6.75	6.00@6.75
Pocah. and New River[1]	* 2.75@2.80	7.50@8.00	7.25@7.50
Philadelphia			
Georges Creek (Big Vein)	1.90@2.00	6.75@7.00	6.50@7.00
W. Va. Freeport	1.15@1.25	6.00@6.25	6.25@6.50
Fairmont Gas mine-run	1.35@1.45	6.25@6.50	6.25@6.50
Pittsburgh (steam coal)[2]			
Mine-run	† 1.30@1.40	4.75@5.00	4.75@5.00
¾-in	† 1.40@1.50	4.75@5.00	4.75@5.00
Slack	.95@1.05	4.75@5.00	4.75@5.00
Chicago (Williamson and Franklin Co.)[2]			
Lump	1.35@1.45	3.25@3.75	3.25@3.75
Mine-run	1.20@1.30	2.75@3.50	2.75@3.25
Screenings	1.00@1.10	2.75@3.75	2.75@3.75
Gross average[3]	*$1.41@1.55	$5.10@5.58	$5.08@5.54

	Gross Averages	
	1917	1916
Jan. 13	4.74@5.11	$1.96@2.17
Jan. 20	4.54@4.98	2.04@2.20
Jan. 27	4.64@5.03	1.99@2.16
Feb. 3	4.66@4.86	1.94@2.10
Feb. 10	4.70@4.95	1.73@1.91
Feb. 17	4.67@5.04	1.71@1.90
Feb. 24	4.95@5.29	1.64@1.84
Mar. 3	5.10@5.48	1.56@1.74
Mar. 10	5.36@5.61	1.53@1.68
Mar. 17	4.80@5.19	1.46@1.65
Mar. 24	4.64@4.94	1.49@1.66
Mar. 31	4.20@4.44	1.46@1.61
Apr. 7	4.07@4.36	1.44@1.60
Apr. 14	4.01@4.35	1.45@1.61
Apr. 21	3.83@4.14	1.46@1.62
Apr. 28	3.81@4.12	1.45@1.62
May 5	4.04@4.40	1.45@1.59
May 12	4.64@4.98	1.44@1.59

[1] F. o. b. Norfolk and Newport News. [2] Per net ton. [3] The highest average price made last year was $4.80@5.33 made on Nov. 25. * Price lower than the week before. † Price higher than the previous week.

BUSINESS OPINIONS

Iron Age—With deliveries and mill conditions growing worse, capacity sold up to an extent precluding normal interest in new business, and with little certainty as to Government needs except that they will steadily increase, the steel trade moves on in an unsatisfactory way.

The letting of contracts by the Shipping Board for a number of steel vessels has been followed promptly by inquiries for plates and shapes, and it is evidently the plan to have such steel provided directly by the Government. Thus far the Steel Corporation has taken the brunt of the Government's plate demands, and independent plate mills have been little interfered with in supplying their regular trade.

American Wool and Cotton Reporter—Selling South American wools for Government purposes was the principal feature of the wool market in the last week. The bulk of wool sold was in the medium and coarser grades. There has been little domestic civilian business. Discounting crop conditions was given as one reason for the advance in cotton. The crop does not seem to be doing particularly well.

Dun—Regular business holds up remarkably well considering its many hindrances, with retail trade in some sections responding to improved weather, and grain crop prospects are more promising. Yet the period of low temperatures was too prolonged to make best results in spring distribution possible, and the accumulations of merchandise reflect to some extent the influence of the extreme prices. Commercial failures this week are 298, against 276 last week, 297 the preceding week and 348 the corresponding week last year.

Bradstreet—Overloaded with orders is the condition of the leading industries, yet distribution of the more commonplace commodities evidences the existence of irregularity plus some conservatism. Preaching of the necessity for economy restricts trade in seasonable fabrics, but even so, the undercurrents seem to be toward improvement, distributive trade apparently aiming to get its second wind. Indeed, wherever the weather has been favorable, retail trade in general has picked up, and, quite significantly, hysterical buying of foodstuffs to hoard against imaginary potential shortage has subsided, but not before consumers upbid prices against themselves.

Dry Goods Economist—With the exception of a few limited areas, a general rise in temperature over the eastern half of the country and in the Southwest is reported by the government bureau. There is no question that with the coming of higher temperatures, which cannot now be long delayed, retailers will experience a renewal of demand. Men who do business on the largest scale, and are close students of the situation and the prospects the country over, are firm in their predictions that our taking part in the war means business expansion.

Marshall Field & Co.—Wholesale distribution of dry goods for the current week is slightly in excess of the same period of a year ago. Road sales for immediate delivery equal the volume of the corresponding week last year, while those for fall delivery are running ahead. Customers have been in the market in smaller numbers. Collections are ahead of a year ago. Cotton goods market continues firm with an upward tendency.

CURRENT EVENTS

Legislative—On May 22 a measure was introduced in Congress, giving the President absolute power to control food stuffs, fuel, clothing, etc. The law is very broad in its scope, and it is generally felt that it will be rushed through both houses of Congress with the greatest dispatch.

The bill empowering the President to direct priority of shipment on certain classes of freight was reported on by the House Committee on Interstate and Foreign Commerce on May 21. This is an administration measure, and will probably go through immediately. It gives the President or his representative the right to require common carriers to expedite the movement of such freight as may be designated.

The Illinois State Council of Defense has laid out plans for taking over the distribution of coal within the state, but as more than 50 per cent. of the production goes to other states, it is more than likely that the National Council at Washington will not authorize such a procedure.

Legal—On May 21 the Supreme Court ordered that the so-called "Anthracite Coal Trust" case be reargued, which apparently means that the decision on this will be delayed for a year or possibly longer. There is a feeling that opinions on the big anti-trust cases will not be rendered until the country has had time to readjust itself to war conditions. The two cases involved in this are, one against the Lehigh Valley R.R. and the other against the Reading, both of which are charged with violating the Sherman Act and also the commodities clause. In both cases the Government lost practically all of its contentions in the lower court.

In the case of the ten officials of Cleveland retail coal companies, who were tried on indictments, charging them with having entered into a conspiracy to fix and maintain coal prices in violation of the Valentine Anti-Trust Law, a verdict of not guilty has been rendered.

Interstate Commerce Commission—On May 22 the Senate passed the bill authorizing the Commission to take complete control of the "movement of railway cars engaged in interstate commerce." The Commission may at any time suspend the operation of all regulations and practices already established relating to car service and put in any new regulations it deems necessary. It further carries a tentative plan authorizing the Commission to purchase freight cars if this should be found necessary to relieve shortage. The bill is now in conference, and as the House of Representatives have a similar measure, it is probable it will be passed very quickly.

The Supreme Court on May 21 handed down a decision upholding the power of the Interstate Commerce Commission to compel the railroads to furnish a reasonably adequate supply of coal cars to handle interstate commerce originating at mines along their lines, and further to award reparation to shippers for failure to supply cars.

The Federal Trade Commission—The activities of this commission have tended to create an easier tone in the anthracite market particularly. While the commission itself has no executive power, any failure to comply with its recommendations would undoubtedly bring out evidence of such power back of it. Radical changes in the prevailing methods of marketing coal are under consideration, due to some recent letters to the

operating interests from the commission. It is understood that selling between middle houses will be prohibited and all the smaller shippers will be compelled to issue regular monthly circulars and adhere to them rigidly. The distribution of coal and the methods of the brokerage houses will also be investigated and the companies required to submit frequent reports to the commission as to conditions. The commission announced on Tuesday of this week, May 22, that it was sending special representatives to all the large distributing centers in the country to make a special study of conditions.

On May 21 the commission made a report in which it recommended the fixing of coal prices, as well as Government regulation of the coal industry. The commission takes the position that the price of a basic commodity such as coal should be fixed in the same way that prices of public utilities of various descriptions are regulated. The commission further recommended strongly that coal miners be exempted from army draft, and that every possible means be used to urge them to remain at their normal occupations.

An investigation of the capitalization of the anthracite coal mines to be taken up at some later date was also announced during the week.

Ocean Shipping—On May 15 the Shipping Board, at Washington, adopted resolutions withdrawing 30,000 tons of coastwise shipping for use in the Trans-Atlantic trade, ship owners stating that this amount of tonnage could be safely withdrawn without seriously interfering with the coastwise shipping. The vessels turned over to this service will be designated by their respective owners and they will be sent to Russia, France and Italy only, Great Britain having sufficient for her own needs.

The Shipping Board is repairing the German ships and putting them in service as rapidly as possible. In the meantime freight rates to Europe continue at extraordinary levels, coal tonnage to Marseilles being quoted this week at about $100 per ton, as compared with $32.40 at this time last year, and $10.80 at the same time in 1915.

The Senate on May 22 passed the bill appropriating $50,000,000 for a Bureau of War Risk Insurance, providing for the insurance of American merchant vessels, officers and crews against loss of life or property. In view of the great dangers in shipping, it is expected that the bill will be passed by the House without any delay or opposition.

Pooling Lake Shipments—The experiment in pooling coal shipments in the Lake trade announced last week will be watched with interest. All the different mining districts will be segregated according to the quality of the coal produced and where a shipper in the Lake trade has not sufficient tonnage immediately available for completing a cargo, coal from some of the other mines in that same district will be taken. In this way it is expected to avoid delay and secure both prompt unloading of railroad cars and quick dispatch of vessels. The railroad men claim that this will practically eliminate car shortage.

It is rumored that a similar plan is being worked out for governing shipments on the Atlantic seaboard with special reference to New England.

Production—The production of coal is falling steadily behind. The average number of cars loaded per day on 85 railroads declined from 27,400 in March to 26,393 in April, showing a loss of 3.7%. Coke shipments for April showed a decline of 2.3%.

The daily rate of shipments of anthracite in April decreased about 5%, as compared with March.

Shipments of bituminous coal over the 13 leading coal roads for the first two months of the current year amounted to only 31,000,000 tons, as compared with 33,000,000 last year.

Production of the Pittsburgh No. 8 District in eastern Ohio for April was only 813,900 tons, a very heavy decline over the figures for the same month last year.

Prices—In spite of the alarming statements by authorities in Washington, threatening drastic action in the matter of the exorbitant prices of coal, the spectacular advance of last week has been fully maintained. Our table of prices shows the gross average exactly the same as on Mar. 3, which was the highest in the history of the coal trade with the single exception of the week following, Mar. 10. Boston prices on Pocahontas and Philadelphia quotations on Georges Creek, showed an advance, while West Virginia Freeport at the latter point declined. Pittsburgh and Middle Western prices were practically unchanged.

Contracting—While contracting continues at a standstill, the occasional bids received on city or Government business give significant evidence of the trend of prices. For instance, the bids for furnishing the public schools in Chicago for the current year increased from a minimum of $5.69 to a maximum of $7.29, as compared with $2.55 to $2.99 last year.

Building Activity—A great deal of hesitancy has occurred in business circles as a result of rumors from Washington to the effect that the Government was contemplating commandeering the steel and lumber plants of the country for use in the construction of ships. This has been authoritatively denied by the Shipping Board, which has issued a statement to the effect that this was only considered as an emergency plan. It is a significant fact, however, that new building in the country is declining very rapidly, due undoubtedly to the high cost of materials and scarcity of labor. Permits issued for new construction in 166 cities for last month amounted to only $86,000,000 as compared with $97,000,000 a year ago. This is especially significant in view of the very heavy increase in the cost of these materials indicating an even larger decline in the volume of building than here shown.

Foreign Trade—April exports of all commodities from the port of New York amounted to $262,000,000, as compared with $184,000,000 in the same month last year.

Labor—The labor shortage continues to become more acute with no relief in sight. A representative of the Consolidation Coal Co. is credited with the statement that the labor supply at four of its biggest operations had fallen off 30% during the last month.

Evidence of how grave the situation is being regarded in this respect is seen in the action of the City Council at Madisonville, Ky., passing an ordinance providing for a $400 license on all labor agents seeking to employ men in that vicinity for use elsewhere.

Both houses of the West Virginia State Legislature passed a law on May 19 requiring all male citizens between the ages of 16 and 60 to work at least 36 hr. per week.

Immigration into this country which is having an important bearing on the labor supply amounted to only 73,568 during the first three months of this year as compared with 85,237 for the same period last year. This is partially made up by a like decrease in the return of aliens to foreign countries, but the net gain in foreign arrivals for the first three months of this year shows a very heavy decline as compared with a normal year, the figures for 1917 being 48,433, as compared with 129,810 in 1913.

Atlantic Seaboard

BOSTON

Prices apparently firm but market dull. Shortage of Pocahontas and New River at Hampton Roads. Better movement on Pennsylvania grades all-rail, and spot market less firm. Retailers doing business on scanty stocks of anthracite.

Bituminous—Poor car-supply and slow movement are blamed for the increasing shortage at Hampton Roads. Practically all the agencies are behind on contract obligations and again there is a scramble to buy small lots in order to clear ships. What little spot coal is on hand is therefore correspondingly high, $8.50 being quoted as an up-set price. As usual, consumers having claims on coal the current month are pressing for shipments. To add to the delays the piers are short of labor and an unusual volume of bunker coal is being called for. Government requirements continue fairly heavy, and all-told there are few signs of improvement in the near future.

On the other hand there seems a lack of interest on the part of current buyers. That much sentimental reliance is being placed upon recent pronouncement by Government representatives is plain from the attitude of several who would otherwise now be in the market. There is very little inquiry for water coal on a delivered basis at the moment and the local market is anything but brisk. A few speculative cargoes that have reached this market are not meeting with the ready sale that was anticipated. Consumers are apparently willing to buy small lots on cars or even small cargoes to tide them over a few weeks but they balk at buying fuel that will last a month or more. What all the optimism is based on is hard to say, but it is a fact that those who are not covered by season contracts are much inclined to play a waiting game.

A small tonnage of high volatile coal is still being offered, but at prices well up to the Pocahontas level; $7.25 has been quoted on the better grades the past week, but for the most part the tonnage is moving to or through factors who control their marine transportation. Already a considerable quantity has come forward for retail distribution and a higher range is likely if the smokeless coals continue in short supply.

Prices for inland delivery are not quite so firm and the demand becoming more spasmodic. Water-power has been excellent, and a large number of mills are requiring less fuel than was expected. The market has to be pretty well combed over to absorb a cargo of any size. The inquiry for small lots is fairly steady, but even among factors who own re-handling plants and are therefore under no special pressure to move coal there is an unevenness of quotations that was not the case a fortnight ago.

Cargoes of Georges Creek are again heard from occasionally. A small lot is still being applied by some of the shippers to last year's contracts, but to the trade which has been most in touch with this grade a cargo is now and then offered at current figures for high-grade coals.

Now that labor difficulties in the Pennsylvania districts are gradually being ironed out there is a better movement to this territory. Orders had accumulated for spot coal and now that the transfer points are open to all the New England roads there is a rush demand for cars.

Prices on the Pennsylvania grades are fairly stable. Buyers are cautious, however, and seek to buy only for urgent needs. Some are still insisting upon the coal being en route before they buy, but that is more or less difficult for the operator on account of the stiff regulations by the railroads against reconsigning.

Spot coal is none too easy to arrange for at Philadelphia and New York, some record prices having been paid the past week. Shippers are adding enough to the mine basis plus freight to compensate for the demurrage charges that are almost sure to accrue; $9 has been paid for good grades.

Bituminous at wholesale is quoted about as follows, f.o.b. loading ports at points designated, per gross ton:

	Clearfields	Camb. and Somersets
Philadelphia	$7.00@8.00	$7.25@8.25
New York	7.05@8.40	7.50@8.50
F. o. b. mines	5.75@6.50	6.00@6.75
Alongside Boston (water coal)	10.75@11.25	11.00@11.50

Pocahontas and New River are now quoted at $7.50@8, f.o.b. Norfolk or Newport News, Va., for spot coal, and $12@13 at Providence and Boston for inland delivery.

Anthracite—Retailers whose usual sources of supply have withdrawn from this market, at least so far as delivered prices are concerned, are finding it very difficult to get cargoes forward. The "independent" shippers prefer accumulating for small boats for New York harbor or along the Sound, and movement to Tidewater is so erratic that it usually takes time to put boat and coal together.

There continues to be high-price coal offering, especially all-rail. Dealers here are not much interested in lower prices if deliveries are lacking. Most of them, as they feel now, would gladly pay the premium asked if there were surety of the coal coming through, bad as the practice is from the standpoint of the public as a whole.

From Philadelphia on anthracite the rate of water freight in railroad-owned transportation was advanced from 85c. to $1, effective May 15. In all, this is an advance of only 25c. over the rate that has prevailed for twenty years or more.

NEW YORK

Anthracite conditions disturbed by investigations. Coal scarce and quotations hard to get. Call for steam coals easier. Soft coal operators upset. Labor poor and car supply worse. Efforts to increase production unsuccessful. Prices decline.

Anthracite—There is no let-up in the call for coal throughout the East but there is not the same anxiety manifested since the assurances of the Federal Trade Commission that there would be plenty of coal. The cool and unseasonable weather has caused a heavy consumption of coal which under usual conditions would have gone into storage.

The market has been disturbed by investigations of one sort or another which have kept condition unsettled. Early this week some local dealers were visited by representatives of the Federal Trade Commission and it is now believed that another inquiry into hard coal conditions with special reference to middle houses, the retail situation and distribution is under way. Later on the Commission proposes to institute an investigation into the capitalization of the anthracite coal mines. It was also said that the Federal body was watching production and consignments from the mines.

Company coals are as scarce as at any time recently. Regular customers are not able to get their full requirements and they are going into the market for independent coals. Buyers are numerous and frequently call on many shippers before they are able to find one with sufficient coal to supply their wants. Stocks are low and production continues light. A heavier output is expected upon the assurances of the union leaders to the Federal Trade Commission that the organization would do its utmost to maintain production at the highest possible capacity for the balance of the year.

Any falling off in the local demand has been made up by the inquiries from the West and New England. Urgent calls for supplies have come from points as far West as Nebraska and from various points in Canada. The call from New England is strong.

Local demand has fallen off, due in part, to the discontinuance of newspaper articles exaggerating the conditions and stating that prices will advance. The city is in the market for 10,000 tons of hard coal, the requirements of 14 departments for next month. The buying will be done under the supervision of the coal committee selected by Mayor Mitchel early this month.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$5.30@5.45	.....
Egg	5.30@5.45	.....
Stove	5.55@5.70	.....
Chestnut	5.60@5.75	.....
Pea	4.00@4.45	$6.50@6.75
Buck	4.00@4.15	5.75@6.00
Rice	3.40@4.05	4.50@4.75
Barley	2.90@3.10	3.50@3.75

Quotations for domestic coals at the upper ports, are generally 5c. higher on account of the difference in freight rates.

Bituminous—Production is low owing to the unsettled conditions in the mining regions and car supply is far below normal, while the report of the Federal Trade Commission on Monday of this week did not have a soothing effect upon the mine owners.

The efforts of the operators to increase production have not shown much success. Many of the mines have been idle from one cause or another. Not all of the mines in the Central Pennsylvania fields whose employees were directed from the Federal Department of Labor to continue at work pending a settlement of their differences with the operators this week, have been operated every day.

Stocks in the New York market are small. Contract coals move quickly but there is not enough to meet requirements and free coals are soon picked up. Industrial plants are short of coal and purchasing agents are frequently in the wholesale district.

It is stated that the Committee of National Defense of the American Railway Association is at work on a problem of pooling the facilities of the railroads, boatmen and coalmen so that the situation in New England will be relieved. This can be accomplished by classifications being eliminated and boats waiting for cargoes of coal taking what is ready to be loaded.

Quotations for spot coals have covered a wide range of prices during the week.

Current quotations, per gross ton, f.o.b. Tidewater, for various grades are as follows:

	Port Reading	South Amboy	Mine Price
George Crk. Big Vein	$7.50@7.75	$7.50@7.75	$6.00@6.25
Tyson	7.25@7.50	7.25@7.50	5.25@5.75
Clearfield	7.25@7.50	7.25@7.50	5.25@5.75
South Frk	.....	7.25@7.50	5.25@5.75
Nanty Glo	.....	7.25@7.50	5.25@5.75
Som'r. Co	7.00@7.25	7.00@7.25	5.00@5.50
Que'ho'ing	7.25@7.50	7.25@7.50	5.25@5.75
W. V. Fa'rm't Th'r'qua	7.25@7.50	7.25@7.50	5.00@5.50
Mine-run	7.00@7.25	7.00@7.25	5.00@5.50
West. Md.	7.00@7.25	7.00@7.25	5.00@5.50

PHILADELPHIA

Anthracite demand shows slight easing off. Trade getting ready to deliver summer orders. Activity of Trade Commission felt. All sizes in heavy demand and yards still bare. Bituminous shows slight changes. Strike conditions improve. Car supply unsatisfactory. Enlistments accentuate labor shortage.

Anthracite—The market shows a tendency to ease off and conditions generally are somewhat quieter. This is due to more seasonable weather which has checked the consumption of coal by the householders. All dealers report a falling off in the demands for immediate deliveries and they hope soon to be able to start in on the early April orders which they neglected for the higher priced transient orders that came later. With the continuance of warm weather the dealers will be able to make good progress on their summer storing orders. Shipments should increase from this time forward and from all indications the present summer will be the most active on record for the retailers. The change in weather has eased the mind of the consumers and while they still urge deliveries, they are in a more temperate mood.

A great deal of the past insistence on the part of consumers to have coal in their cellars was due to the campaign started by the mining companies toward the end of last March in which the dealers were urged to impress upon their customers the importance of taking in their coal in the summer time. The state of fear aroused by the declaration of war, was also an important factor in this connection. Even now with the fears of the people somewhat allayed, practically all consumers are laying in a few extra tons and for this reason the dealers will probably go into next fall with very little coal stored in their own yards.

While receipts have not increased much, dealers are feeling more at ease due largely to the activities of the Federal Trade Commission; they believe that with the proposed restrictions placed on the middle houses there will soon be more coal coming into this market. The powers of the commission do not allow them to insist upon compliance with their suggestions, but undoubtedly the power that created the commission will also compel the strictest acceptance of their decisions should it be necessary.

Dealers stocks of all sizes are extremely low, as they have been for months and no dealer can be found who has a supply of all sizes. Shipments of late have been curtailed very considerably by trouble with the car supply, which shows no sign of improvement over the past ten days. Rail shipments have also suffered somewhat in order that some shippers could take care of the long neglected water yards, which since the opening of navigation are beginning to get some fairly good shipments.

The relative demand and shortage of the sizes remain about the same as last week. All sizes are scarce, with stove and pea the worst. Pea particularly fails to show improvement and dealers who always commenced stocking at this time of year have not as yet even been able to meet current demands for this size. As a matter of fact many of them are gradually losing hope that they will be able to accumulate any stock of this size and are making plans to utilize the pea storage space with chestnut, the next most popular winter size, depending of course if they can even get that size in sufficient quantity. A few are fairly comfortable on egg and chestnut, but have business far in excess of the amount on hand.

Most dealers still comment on their ability to collect their accounts and in turn are able to keep in high standing with their shippers.

All steam sizes continue in strong demand and the increased circular prices of about 30c. a ton in no way affected the demand. Most companies seem to be adhering to the rule not to take any more contracts, although occasionally they listen to the appeal of a new customer or two and accept his business for a restricted amount.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.05	Buck	$2.80	$3.70
Egg	4.05	5.15	Rice	2.30	3.30
Stove	4.30	5.50	Boiler	2.10	3.20
Nut	4.40	5.45	Barley	1.80	2.05
Pea	3.00	3.90			

Bituminous—There have been some slight fluctuations in price, a few grades running slightly higher, although on the whole most of the changes were slight decreases, with some coals stationary. On the whole the prices are almost on the same level as last week with the majority of the sales being made around $6 to $6.25, and with supplies hard to get.

The strike situation in the Central District is understood now to be as good as settled, although the final ratification has not as yet been secured. The usual number of petty strikes throughout all districts continue and contribute quite a little to retard production.

The car supply has been particularly annoying of late and this week a number of operations were compelled to close for the lack of cars. In other instances work was only continued when the railroad companies allotted cars with the understanding that they were to be loaded with railway fuel. This week also there seems to have been an appreciable increase in the amount of coal taken by the railroads for their own use.

Mine operators are inclined to criticize the method of car distribution and it is stated that a movement is under foot to secure some regulation whereby cars loaded with coal for the big industrial plants can be returned at once to the coal trade in a fair proportion instead of all being pressed into the general freight service by the plants unloading them. As is well known, many of the big manufacturing plants for this reason have a 100% car supply on account of the fact of their being able to utilize the equipment which has brought coal and other raw material to them.

Inquiries for coal continue in good volume, although much complaint is heard of the prices being charged for spot coal. This is particularly true of the public utility plants, most of whom in this district declare that because of the rising cost of fuel they are now operating at a loss. They state other enterprises can meet this by increasing the price of their product, but they are unable to do so on account of the supervision of the Public Service Commission and the length of time it takes to get action.

Some complaint is also being heard from the operators on the score of the slight diminution of the labor supply recently owing to the enlistment of the younger men. Even though it is generally understood among the men themselves that miners will more than likely be exempted under the provisions of the conscription laws, yet the younger element are showing their enthusiasm in leaving the mines in groups and volunteering in the different services. With all respect to their patriotism, pressure is being brought to bear to have such men returned to the mines where they can be of even greater service to their country.

The prices per gross ton, f.o.b. cars at mines, are as follows:

Georges Creek Big Vein	$6.75@7.00
South Fork Miller Vein	6.50@7.00
Clearfield (ordinary)	6.25@6.50
Somerset (ordinary)	6.25@6.50
West Va. Freeport	6.00@6.25
Fairmont gas lump	6.25@6.50
Fairmont gas, mine-run	6.25@6.50
Fairmont gas, slack	5.75@6.00
Fairmont lump, ordinary	6.00@6.25
Fairmont mine-run	5.75@6.00
Fairmont slack	5.75@6.00

BALTIMORE

Movement of fuel to tidewater the poorest in history of trade. Prices for spot coals far above offerings at mines. Hard coal very scarce.

Bituminous—The average time for the movement of coal from mines to terminals here is the largest in the history of the Baltimore trade. On both the Pennsylvania and Baltimore and Ohio coal has been en route in many cases for from two to three weeks. Several concerns here which were notified of coal shipments from mines three weeks ago still find the fuel tied up in a mass of other freight at Brunswick, Martinsburg and other switching and yard points. Preferential shipments for the government have added to the confusion. The railroads also claim that instead of the usual shipments being made to the Lakes and the West generally that everything has apparently been turned East, thus increasing the congestion.

At times during the past week all the terminals, with the exception of the Western Maryland Railroad yards at Port Covington, were practically clear of coal. The latter road has been able to maintain a fair movement of fuel, and has immeasurably aided a situation that would otherwise have been so acute as to threaten an industrial tie-up. Spot coals here are selling at about $1.50 higher than offerings at the mines. Steam coals at tide were worth on a mine basis of from $7 to $7.50, while gas coals sell around $7 for all grades.

Prices to the trade at the mines, f.o.b., are about as follows, when coal is to be had at all for immediate delivery: Georges Creek Tyson, $6.25; Somerset, $6; Quemahoning, $6; Clearfield, $5.75; Freeport, $5.25; Fairmont gas, three-quarter, $5.50 to $6; run-of-mine, $5.50; slack, $5.50.

HAMPTON ROADS

Prices at recent levels. Congestion at piers. Shortage of cars still acute. Delays in discharging at New England terminals. Shortage of labor.

Prices are at last week's quotations, with no signs of a break for the time being. It is by no means improbable that they will not advance in view of the probable requirements of the Navy Department in the near future. Sales are principally for small lots, as none of the shippers is able to quote for any considerable tonnage. The shortage is probably more acute than for some months past. One of the largest shipppers was forced to shift a 3000-ton vessel from Newport News to Lamberts Point and back to Newport News to complete the cargo. This is only one instance of several cases of this kind.

While Lamberts Point is in fairly good shape, the congestion at Sewalls Point and Newport News is still causing serious delays. The shortage of labor plays a large part in this. About this season a number of the negro laborers leave the coal piers and go into the strawberry fields, where they spend several weeks. And as this is a great trucking section considerable labor is required and the farmers pay, for the time being, more than the railway companies, with the result that the situation is very bad at times.

Distressing reports of shortage of cars at the mines are still the rule and this, together with insufficient motive power, prevents the accumulation of any stocks at Hampton Roads. Vessels are being delayed in discharging at New England ports, due to shortage of cars. One small steamer was five days discharging at Portland. With the high rates of freight, owners do not look with favor on any delay, as every hour means many dollars. On account of the high price of steam coal many apartment house owners are considering using anthracite for heating purposes next winter. Anthracite and semibituminous are about the same price in the local market at present.

Current quotations for Pocahontas and New River run-of-mine are $7.50@8.50 per gross ton, for coastwise and foreign shipment. For bunker delivery around $8@8.50 per gross ton, plus 15c. trimming. For local consumption $7@8 per net ton on tracks in carloads. Anthracite, $8.50 per net ton delivered for cash.

Dumpings at the Hampton Roads piers for the past several weeks were as follows:

	Apr. 28	May 5	May 12	May 19
Nor. & West	88,577	104,677	165,326	146,730
Ches. & Ohio	126,533	104,567	104,252	117,143
Virginian	116,468	89,366	95,462	112,975
Total	331,578	298,610	365,040	376,848

Ocean Shipping

COASTWISE FREIGHTS

Sentimentally, compared with the range of the past month, water freights are weaker. Large tonnage can be had today at $4.50@4.75, inquiries are so few. Hardly any of the shippers are in position to give dispatch or even to load transient boats at all.

New York rates to Boston are quoted at $2.50, a drop of 25@50c. from a week ago. On Long Island Sound $1.75 is now a fair basis. Any improvement in the supply of anthracite at the piers would doubtless cause freights to harden again. Four dollars has again been paid on small tonnage to points east of the Penobscot.

OCEAN FREIGHTS

Freight rates to Mediterranean and South American ports are even stronger than a week ago, but to other destinations are unchanged.

Although we have chartered a few steamers for export coal since our last freight report, none of these fixtures have been made public.

We would quote freight rates on coal by steamer as follows:

Europe	May 14	May 21
West Coast Italy	$85.00@100.00	$100.00 about
Marseilles	80.00@100.00	100.00 about
Spain(Atlantic)*	30.00@ 36.00	30.00@36.00
Spain(Med't'n)*	32.40@ 38.40	32.40@38.40

Note—Charters for Italy, France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge."

South America		
Montevideo	$28.20 about	$28.80 about
Buenos Aires	28.20 about	28.80 about
Rosario	30.00 about	30.00@31.20
Rio Janeiro	[2]26.00@28.00	[2]27.00@30.00
Santos	[2]28.00@30.00	[2]30.00@32.00
Chile(good port)	17.00@18.00	17.50@18.50
West Indies		
Havana	5.50@5.75	5.50@ 5.75
Cardenas, Sagua	6.75 about	6.75 about
Cienfuegos	7.50 about	7.50 about
Port au Spain	11.00 about	11.00 about
St. Lucia	11.00 about	11.00 about
St. Thomas	8.75@9.00	8.75@ 9.00
Barbados	11.00 about	11.00 about
Kingston	7.00@7.25	7.00@ 7.25
Curacao[1]	9.25 about	9.25 about
Santiago	7.50 about	7.50 about
Guantanamo	7.50 about	7.50 about
Bermuda	6.00 about	6.00 about
Mexico		
Vera Cruz	9.00@10.00	9.00@10.00
Tampico	9.00@10.00	9.00@10.00

* Spanish dues for account of cargo. [1] And p.c. [2] Or other good Spanish port. [3] Net.

W. W. Battie & Co.'s Coal Trade Freight Report.

Lake Markets

PITTSBURGH

Lake movement to be expeditious. High spot market is maintained. No thought of contracting.

Bright hopes are entertained that the Lake coal movement will be well handled and that a maximum tonnage can be moved with a minimum of confusion. The pooling system has been arranged in a general way, whereby vessels will be loaded at Lake Erie ports as the coal comes, the coal being simply graded into general divisions, each shipper receiving equivalent coal at upper lake ports. It is confidently expected this system will prevent congestion at the Lake Erie docks and will bring cars back promptly.

The spot coal market has been a strong one every day since last report and the high prices reached seem likely to be maintained as there is no influence in sight likely to depress the market. Some observers call the market a trifle higher than reported a week ago, but in general no change can be observed.

The establishment of the spot market on such a high level, say $5 a ton, before the Lake coal movement has become heavy, has served to discourage any ideas that might have remained as to making contracts for the remainder of the fiscal year. The buyers cannot risk taking hold at prices near the spot market, while operators can see no reason why they should sell on contract at much less. As a result most of the coal movement will be either on spot sales or on regular shipments with a weekly price adjustment in conformity with the spot market.

We quote spot coal at $4.75@5 for steam and $5@5.25 for gas, either slack or mine-run, per net ton at mine, Pittsburgh district. Very little slack is being produced.

BUFFALO

Some slowing down in bituminous. Miners working better and cars a trifle plentier. Demand much the same. No improvement in anthracite shortage. Local supply small.

Bituminous—The trade is dull, with prices slightly easier. Jobbers are of the opinion that the highest price has been reached, though it will take another week or two to make sure of the relaxation on the part of operators. As a rule the jobbers lay it all to them; if they send in a good-sized order a few cars would be billed and then prices withdrawn and next day or so new and higher prices would be quoted. Jobbers' margins were also liberal, so that the consumer paid heavily.

There are now reports from the bituminous districts that the miners have gone back to work pretty generally since the last wage agreements were made and it is hoped that most of these difficulties are over for the season. At the same time labor will continue short. Cars are a trifle easier and that has had to do with the general situation. This shortage had been made the cause of the failure to fill orders and it was no doubt the general reason, though buyers were sometimes a trifle suspicious. Jobbers report cars delayed till they had been sold half a dozen times and perhaps advanced several dollars a ton in price.

Prices are not so strong, but the decline is trifling as yet. Jobbers would like to see at least a dollar decline, followed by a steady price. Operators cannot control the car situation, but it would be easy to steady up prices considerably. Quotations are:

Youghiogheny Gas	$6.25@6.75
Pittsburgh Steam	6.15@6.65
Ohio No. 8	6.10@6.60
Bessemer	6.00@6.50
Allegheny Valley	5.90@6.40
Cambria Co. Smithing	6.75@7.25
Pennsylvania Smokeless	6.85@7.35
All Slack	5.85@6.35

All prices quoted are per net ton, f.o.b. Buffalo.

Anthracite—There is no apparent improvement in the situation. This is shown by the Canadian as well as the local trade. Half a day every other day is about all that the city retail trestles are able to run and some of them cannot even do that. Coal dealers from Canada come over in great numbers and use the telephone very liberally in their efforts to get coal. All the shippers can tell them is that they are wasting their money, for the coal is divided up as carefully as possible and everybody given his proportion. The difficulty seems mainly to be that consumers are scared; if they would ask for a ton at a time they would all get a supply.

City retail prices are now $7.85 for stove and chestnut, $7.60 for egg, $7.35 for grate, $6.75 for pea, $6 for buckwheat, $9 for cannel and smithing, all per net ton delivered.

Shipments by Lake for the week were 98,150 net tons, distributed as follows: 43,300 tons to Duluth & Superior, 26,000 tons to Chicago, 11,400 tons to Sheboygan, 9200 tons to Fort William, 3000 tons to Green Bay, 3000 tons to Hubbell, and 2250 tons to Racine. Rates not yet established.

DETROIT

Steam coal users continue buying steadily and prices are well maintained. Anthracite receipts are light. Pool is formed to handle Lake coal shipments.

Bituminous—Steam coal is not arriving in Detroit in such quantity as to show any surplus stock. Consumers maintain a regular demand which contributes toward holding prices at about the same level as a week ago. There is no free coal of any consequence on tracks, as consumers have taken virtually all the coal before it reaches Detroit.

Jobbers are quoting egg and lump at $4.75 to $5 at the mines. Slack from West Virginia districts commands about $4.50 at the mines and mine-run of good quality is reported selling at $4.25 at the mines. The market is practically bare of smokeless coal. While admitting uncertainty as to their ability to deliver this grade, some of the jobbers are making a price of $6 on smokeless egg and lump at the mines and around $5 on fine coal. With the advent at last of temperatures suggestive of summer, the household inquiry for domestic coal is largely curtailed. Retailers have been buying in quantities sufficient to meet needs of their customers, though little attention has been given yet to stocking up for fall trade.

Anthracite—Despite recent interviews by government officials who discourage the buying of anthracite at what are described as "exorbitant prices," customers of Detroit retail dealers are showing an unusual interest in the market and a greater number than usual at this time of the year are arranging to put in their next winter's supply of coal now. The volume of incoming shipments continues light and it seems likely a considerable proportion of orders placed for May delivery will have to be carried over.

Lake Trade—Lake shippers and railroad officials have joined in formation of a Lake coal pool, the purpose of which is to facilitate Lake and rail movement. F. A. Baird, of Pittsburgh, has been appointed commissioner with headquarters in Cleveland and will have supervision over all shipments from ports between Erie and Toledo on Lake Erie. Under the new plan freighters handling coal will be afforded speedier dispatch as receipts at loading docks will be grouped, by putting coal of similar grades together, thus filling out cargoes.

For the third time, the Detroit board of education is soliciting bids for supplying coal to the city's public schools for the year commencing July 1, 1917. Approximately 30,000 tons of nut, pea and slack are required. On the date set for opening bids previously solicited on two occasions, not a single bid was received. The United Fuel & Supply Co., Detroit, contractor for the current year, experienced much difficulty in providing coal during the winter and has just effected a settlement with the board of education at $3.25 a ton, the contract price delivered in schools, after an endeavor to collect $6.25 on part of the supply, which the company was obliged to buy in the open market.

CLEVELAND

Car supply better. Prices show small decline. Lake business slow. Big decrease in production.

Wholesale prices in this market have eased off from twenty-five to fifty cents per ton during the past week due to a somewhat better car supply at the mines and also a lull in the Lake end of the business on account of the scarcity of boats for loading. Vessels are still meeting with delay on account of the ice in the upper Lakes, and but very little coal, compared with last season, has been moving to the Northwestern docks. This has enabled operators to ship an increased tonnage on rail contracts and this has caused several large consumers to desert the spot market temporarily. There is no probability, however, that prices will continue long at this level as the Northwestern docks must have the coal and just as soon as the Lake boats are able to make their trips on schedule time there will be a big rush for Lake coal which will force prices higher.

To date the shipments of coal to Northwestern docks are about one million tons behind those for the same period a year ago. The shipments to the American head of the Lakes from the start of navigation to May 15 were: Anthracite, 83,700 tons against 145,300 tons for the same period a year ago; bituminous, 283,900 tons against 648,600 tons last year. The cargoes this season number 44, against 101 for the same period a year ago.

During the month of April the Pittsburgh No. 8 district, in eastern Ohio, produced 813,900 tons. This is about 50 per cent. of what that district produced in same month a year ago. Poor car supply and scarcity of labor are the causes of decreased production.

Following are the market prices per short ton, f.o.b. Cleveland:

	Three-quarter	Mine-run	Slack
No. 8	$5.50	$5.50	$5.50
Cambridge	5.50	5.50	5.50
Middle Dist.	5.50	5.50	5.50
Hocking	5.25	5.25	5.25
Pocahontas	....	7.50	....

TOLEDO

Market strong and prices high with still further increases expected when manufacturing for War Department gets under way.

The coal market in this vicinity remains strong and active. Wholesalers feel confident that the demand will increase greatly when factories commence the manufacture of war munitions and army supplies. The car shortage has been relieved to some extent by the opening of navigation. The city recently tried to place a contract for a supply of coal but met with no success. Pocahontas is nearly off the local market at present, the little available being quoted at $6@6.25; Hocking lump, $4.75@5; Hocking mine-run, $4.25.

The embargo on Lake coal, recently placed by the C. & O. Ry., has had no effect on the market here up to the present time. There is plenty of coal awaiting shipment and the only difficulty is the scarcity of bottoms to carry it in. Boats have been coming in solwly but relief is expected soon as a number were reported to be due here now. This year a great many steamers will be engaged in the Canadian coal trade.

COLUMBUS

Active buying of steam and domestic varieties. Prices strong and stocks are more plentiful.

While the period of hysteria seems past for the time being at least, there is still a strong demand for both domestic and steam sizes. Buying to guard against a possible shortage later on is now the rule among the larger steam users. Considerable buying is also reported from dealers, who see a busy stocking season ahead. On the whole the tone of the market is steady and prospects are for an active demand from all sources.

Domestic trade is being looked after more closely as dealers are trying to accumulate stocks to be able to take care of early household orders. Retail stocks are being gradually increased and at present they are as large as usual. Pocahontas demand is exceedingly strong and stocks are rather limited. Prices on Pocahontas remain high. West Virginia splints are also strong.

Steam business is one of the active departments of the trade. Demand from all lines of manufacturing continue strong and efforts to accumulate a surplus have not proven very successful. Inquiries for contracts are coming in rapidly but producers and jobbers are not anxious to tie themselves up. Railroads are getting their coal around $2.95 to $3. Some private users have contracted for limited tonnage around $2.75 to $3.25.

Lake trade is now growing active. The pooling arrangement of Lake shippers will go a long way to facilitate the Lake trade. Cargoes are moving from lower Lake ports to the Northwest and freer movement is reported from the "Soo."

Prices on short tons, f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Rescreened lump	$4.50	$4.75	....
Inch and a quarter	4.50	4.75	$4.50
Three-quarter inch	4.25	4.75	4.25
Nut	4.25	4.50	4.25
Egg	4.25	4.50	....
Mine run	4.25	4.50	4.25
Nut, pea and slack	4.00	4.00	4.00
Coarse slack	4.00	4.00	4.00

CINCINNATI

Increasing demand is in evidence in all quarters, while a threatened labor shortage is faced by operators. Jobbers are unable to supply demand.

The phenomenal strength of the coal market has been increased, if anything, by a growing conviction that manufacturing activity is to be of record-breaking proportions during the remainder of the year, and that it is going to be difficult to secure enough coal to supply requirements. The limited transportation facilities available continue the greatest factor in causing higher prices, while the operators are also facing a diminishing supply of labor, due to the number of men taking up farming, the increasing number drawn away by prospects of higher wages in manufacturing, and the considerable number enlisting in the army, as well as those later to be taken by the draft. Prices quoted are purely nominal, and no operator cares to bind himself to a schedule of prices for future delivery under existing circumstances. Contracting is at a standstill.

LOUISVILLE

Embargoes at river crossings cause temporary decline in coal prices of which consumers south of the river are taking advantage. Car and labor supply very unsatisfactory.

Temporary relief from the stress of the last few weeks was brought about in the Kentucky fields by establishment at Louisville and Cincinnati on May 17 or before, of embargoes, except on public utility coal, perishable commodities and government supplies. Two roads out of Louisville were excepted. This had the effect of reducing prices from 50 to 75c. with further reductions in prospect if the embargoes continue.

Extremely unsatisfactory supplies of cars are the rule, the week seeing cars provided only on two to four days and in insufficient numbers then. Labor conditions are not improving. An investigation by the grand jury is progressing with much publicity at Louisville but is not giving the coal men much concern in view of the fact that it is expected to result in nothing more than to establish the fact that coal is short.

Eastern Kentucky quotes block at $4.75@5.25; mine-run, $4.50@5; nut and slack, $4.25@4.75. About the only coal available is second and third class, which is all mine-run, operators producing it not having facilities for screening.

Western Kentucky quotes lump $3@3.25; mine-run, $2.50@3; nut and slack, $1.75@2.50. All prices f.o.b. the mines.

BIRMINGHAM, ALA.

Local market very active and scarcity of coal has caused a stiffening in prices. No improvement in car supply as a whole, though some better the first half of the week. Free coal very scarce.

The only noticeable change in local conditions over a week ago is a decided stiffening in prices and a more acute shortage in supply. Consumers are so anxious for coal that little attention is paid either to grades or prices, and when they find a few cars they buy it quick before the other fellow gets it. The best grades of mine-run coal have been selling from $4 to $4.25 per net ton mines and the cheaper grades from $3.50 to $3.75 per ton. Lump and nut gas coal brought $4.25.

With production being maintained at the maximum capacity of the mines consistent with car supply and labor conditions, producers seem to be unable to increase the supply of free coal, but on the other hand the scarcity appears to grow more acute each week.

Very little domestic coal is available and quotations range from $4 to $5 per ton mines.

Coke

CONNELLSVILLE

Spot coke higher. Contract market stagnant. Car supplies relatively poor.

The poorer car supplies referred to in last report eventually had the effect of stiffening the spot furnace coke market, which is now close to $8.50 as compared with $8 a week ago. Foundry coke, however, has been in relatively light demand and the outside prices obtained recently on a few brands can no longer be had. The minimum is no lower, however.

Recent inquiry for furnace coke for the second half of the year seems to have died out, and the contract market is considered stagnant. There were three small contracts placed, at intervals, for second half at $8 and there is a rumor of one larger contract at that figure. The present position is that operators would not quote $8 while there are only a few who would quote at all, and they regard $8.50 as a fair price. The condition will probably result in many consumers buying their coke at short intervals instead of for the half-year.

Considering the high price of coal, say $5 a ton in the Pittsburgh district, coke prices at $8 or somewhat higher are reasonable. There is no direct connection between the markets, however, because the high price for coal is made by car scarcity, against the regular allotments of the coal mines, while the coke operators usually have no allotments at all for coal cars, and hence could not ship raw coal as an alternative.

We quote: Spot furnace, $8.25@8.50; contract, $8@8.50; spot foundry, $9.50@10; contract, $9@9.25, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended May 12 at 380,530 tons, a decrease of 19,567 tons, and shipments at 378,890 tons, a decrease of 39,112 tons.

Buffalo—The trade is good, but it would be much more active if there were more cars to handle it. Reports from the Connellsville district complain of a greater car shortage now than at any former time, sometimes none at all being available for days at a time. Prices are strong at $11.50 for best 72-hr. Connellsville foundry, $11 for 48-hr. furnace and $9.75 for low grades and stock.

Chicago—Furnace and foundry cokes are selling at about $8, f.o.b. cars the ovens. There is very little domestic coke being offered, most of it having been contracted for earlier in the season. A few Chicago retailers are selling in one-ton lots at $9.25.

Middle Western

GENERAL REVIEW

Prices remain firm, while buying continues extremely heavy. Car situation much improved. Very little anthracite and Eastern bituminous coming to the Western market.

In some instances prices are lower than last week's figures, as, for instance, about 25c. off on Eastern bituminous, but very little of this coal is available for this market. Local buyers are placing fewer orders for these coals on account of the high prices, preferring to make their purchases closer home, where lower mine prices and lower freight rates prevail. The consumer has also found that he will have to be satisfied with whatever coal his dealer sees fit to furnish.

The shortage of anthracite is very acute, and the prospects are there will not be much improvement. The dock companies report they are unable to take care of customers, and the amount of hard coal received at the head of the Lakes since the opening of navigation is 80 per cent. below receipts last year for the same period. One Duluth dock has received less than 20,000 tons and has firm orders aggregating more than 80,000 tons. This is not unusual, many of the docks reporting like conditions.

The Illinois State Council of Defense has made plans for practically taking over the distribution of coal for the State of Illinois, but inasmuch as less than half of the production is consumed within the state, it is very doubtful if the council will have authority to take this action or put it in effect.

Some of the railroads are reported to be short of coal and having a great deal less in storage than usual at this season of the year. Two of the roads in the greatest need of coal are the Pere Marquette and the Great Northern The latter has been buying heavily in Illinois the past month, but this tonnage is only making up for the loss of supply from the docks.

Temporary embargoes have been placed by four railroads traversing the Illinois coal fields. The roads affected are the Vandalia, Louisville & Nashville, Southern and the Chicago & Alton.

CHICAGO

Southern Illinois prices remain firm and no increases except in isolated cases. Indiana mines report slight increase in prices on all grades. Car situation much improved and 20 per cent. better than for past six weeks.

During the past week the mines in Indiana and Illinois have produced more coal than in any week since early in March. The improvement in car supply is responsible for this showing, and it is reported that the Federal Trade Commission and the Peabody Committee of the National Council of Defense should be given the credit for this improvement.

About four cargoes of anthracite have been received at Chicago the past week, but this is not satisfying demand.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Springfield	Fulton & Peoria Cos.	Clinton & Sullivan Cos.	Green & Knox Cos.	Carterville
Domestic lump	$3.25	$3.25@3.50	$3.75@4.00	$3.25@3.50	$3.25@3.75
Steam lump	3.00@3.25	3.25@3.50	3.50@3.75	3.00@3.25	3.00@3.50
Egg	3.25	3.25@3.50	3.75@4.00	3.25@3.50	3.25@3.75
Nut	3.25	3.25@3.50	3.75@4.00	3.25@3.50	3.25@3.75
Mine-run	3.00@3.25	3.00@3.25	3.50@3.75	3.00@3.25	3.00@3.50
Screenings	3.25	3.00@3.25	3.50@3.75	3.00@3.25	3.00@3.50
	Williamson & Franklin Cos.	Saline & Harrisburg	Poca. & W. Va. Smokeless	Penna. Smokeless	Eastern Kentucky
Lump	$3.25@3.75	$3.25@4.00	$6.00@6.50	.....	$4.50@5.25
Egg	3.25@3.75	3.25@4.00	6.00@6.50	.....	4.50@5.25
Nut	3.25@3.75	3.25@3.75	.....	.....	4.50@5.25
No. 1 nut	3.25@3.75	3.25@3.75	.....	.....	.....
No. 2 nut	3.25@3.75	3.25@3.75	.....	.....	.....
No. 3 nut	3.00@3.75	3.00@3.50	.....	.....	.....
No. 1 washed	3.25@3.75	.....	.....	.....	.....
No. 2 washed	3.25@3.75	.....	.....	.....	.....
Mine-run	2.75@3.50	2.75@3.50	5.50@6.00	.....	4.25@4.75
Screenings	2.75@3.75	2.75@3.50	.....	.....	.....

Hocking Lump $4.50@4.75. Splint Lump $4.00@4.75.

LaSalle, Grundy and Bureau Counties:

Lump, egg and No. 1 nut	$3.00@3.50
No. 1 nut—washed	3.00@3.75
Screenings—raw	2.75@3.25
Screenings—washed	3.00@3.50
Mine-run	2.50@3.00
Steam lump	2.75@3.25

The Chicago Board of Education has turned down all bids on coal for supplying the 14 school districts the ensuing year. A special committee on coal has been appointed and instead of making contracts, as has been the custom heretofore, all purchases will be made on the open market. The Worth-Huskey Coal Co. was the lowest bidder and its price was $536,000 higher than for the same amount of coal last year.

In Franklin County the mines have been operating about 70 per cent. of full-work time, and this week's showing is better by 20 per cent. than any week since early in the spring. The mines are practically sold up for the next 30 days. Prices have not changed except in a few cases there have been premium sales, but to territory not regularly taken care of. All orders are being accepted at "price current at time of shipment."

The Williamson and Saline County mines report a better running time due to increased car supply than for some time. The operators have sold up all of this coal for the next month, and prices range as high as $4.25 on sized coal, with screenings firm at $3.25. Some steam coal has moved at unusually high prices, $3.75 being the maximum. Anthracite rail shipments are practically nil and dealers are six weeks behind on orders. Prices are nominal.

Springfield coals are all quoted at an even price, $3.25 at mines. Demand has been very keen and car supply somewhat better than previous week. A great deal of this coal is moving under contracts to the railroads.

Fulton and Peoria, La Salle, Grundy and Bureau Counties are unable to supply the local markets adjacent to the mines. Prices are up as high as $3.50, and the supply of cars has been good, but shortage of labor has reduced the output, and movement has not been greater than during the serious car shortage.

The Indiana mines are having an excellent demand from the retailers and steam plants. The operators are endeavoring to hold prices down, but some sales have been made at $4 for sized coal. The regular trade is being taken care of at prices considerably lower than the existing spot market.

Very little West Virginia smokeless is coming to Chicago, and the sales being made are commanding a good price. This is also true of Hocking and eastern Kentucky. The latter has quite a range in price and purchases have been made as low as $4.50 and as high as $5.50.

ST. LOUIS

Market is easing up. Some grades experience a genuine break, due to a concerted effort on the part of buyers. Car shortage still prevails. High grades rather firm. Eastern coals in demand and unobtainable.

The market for Standard coal has dropped $1.25 a ton on domestic sizes. There was no buying on the part of the big interests and practically all of the coal from the Standard field is moving on short-term railroad contracts and orders. Over two-thirds of the open-market tonnage from the Standard field is moving to the north and northeast at fair prices, but coal in equipment for St. Louis brings whatever the market will stand, and this has been the cause of the extraordinary decline.

Locally, all sizes of Standard are worth $1.75 at the mine. Coal for Chicago and the Northwest will bring anywhere from $2.15 to $2.30 for screenings, 2-in. lump and nut, and as high as $2.50 for 6-in. lump and 3x6 egg of good preparation. Unless there is more buying the Standard price will continue to go down, although it is not likely that it can go much further.

In the Mt. Olive field the operators charge their regular trade in St. Louis, $2.25 for all sizes, and on equipment that will go to the country they get $3. Railroads are still getting in heavily on this tonnage and the Chicago market figures conspicuously. This field is oversold for some time ahead as a rule.

In the Williamson and Franklin County field the market has eased up some. A week ago coal was selling at from $3.75 to $4 in isolated cases.

but it dropped to from $3.25 to $3.50, with very little call locally, though there is a rather good country demand. There is nothing to indicate that the coal in this field will go any lower in price, as most of the mines are sold up for anywhere from one to two months, and the car supply is exceptionally bad. The only coal offered on the open market is that in restricted equipment. It is likely that there will be an increase in the circular on this grade, June 1. The prevailing circular is $3.25, but the open market price is above this.

Car supply is averaging about two days a week on all roads. An effort is being made on the part of the railroads to eliminate some of their passenger service and put the motive power into the freight service. This is expected to give the mines about 15% more equipment.

Contracting is out of the question at the present time. Operators will not entertain a contract at any figure.

During the past week about 60 cars of anthracite coal moved in and something like 22 cars of smokeless. The Arkansas tonnage during the past week is estimated at 85 to 90 cars.

Locally, retail conditions have improved to the extent that orders are not swamping the dealers. The retail price for alley or street delivery in St. Louis is, per net ton: Williamson and Franklin County, $6; Mt. Olive, $4.50; Standard, $4; anthracite chestnut, $11; egg and stove, $10.75; Arkansas anthracite, $9; West Virginia egg and lump, $9.50; byproduct coke, $12.25; gas coke, $11.

The prevailing market here is per net ton, f.o.b. mines:

	Williamson and Franklin Co.	Mt. Olive and Staunton	Standard
6-in. lump	$3.25@3.50	$2.25	$1.90@2.15
3x6-in. egg	3.25@3.50	2.25	1.90@2.15
2x3-in. nut	3.25@3.50	2.25	1.90@2.15
No. 2 nut	3.25@3.50	.....	.....
No. 3 nut	3.25@3.50	.....	.....
No. 4 nut	3.25	.....	.....
No. 5 nut	2.50@2.75	.....	.....
2-in. screen	2.75@2.90	2.00@2.25	1.75@1.90
2-in. lump	.....	.....	1.75@1.90
3-in. lump	.....	2.25	.....
Steam egg	3.25	2.25	1.75@1.90
Mine run	3.00	2.25	1.75@1.90
Washed			
No. 1	3.75	.....	.....
No. 2	3.50	.....	.....
No. 3	3.25@3.50	.....	.....
No. 4	3.25	.....	.....
No. 5	2.50@2.75	.....	.....

Rate on Williamson and Franklin County is 72½c. Rate on other fields is 57½c.

KANSAS CITY, MO.

The settlement of the wage controversy, and a slight easing in car congestion, have made the market steadier. Prices are generally getting onto a new basis, though final quotations have not yet gone out on some lines. It is estimated that contract basis will be fifty cents higher because of the new wage schedule.

The following mine prices indicate the present levels at Kansas City:

	Price	Freight
Cherokee lump and nut	$3.50	$0.90
Nut-run and mine-run	3.00	.75
Mill	2.75	.75
Slack	2.50	.75

MILWAUKEE

Market held firm, because of a hysterical demand, and despite fair cargo arrivals.

The demand for coal continues abnormal for the season of the year, for the reason that householders are obsessed with the idea that a fuel famine is in prospect for the coming winter. Dealers are booking orders from this class of customers faster than they can be filled, and it will take some time, even if the rush should subside, to catch up with the accumulation of obligations.

Anthracite egg sells at retail for $9.10, nut at $9.35, pea at $8.10 and buckwheat at $7.50. Pocahontas lump is held at $9.50 and mine-run at $8. Hocking is quoted at $8, coke at $9.25 and pea coke at $7. The wholesale rates at the dock yards, f.o.b. wagons or cars is a dollar less. Retailers charge from 35 to 50c. per ton, where coal is carried into bins. Steam craft pay $7 per ton for bunker coal.

Thus far this season 59 cargoes of coal have been delivered in Milwaukee harbor. Nine cargoes were hard coal and aggregated 64,327 tons. The remaining 50 cargoes of bituminous coal aggregated 355,274 tons.

General Statistics

EXPORTS BY DISTRICTS

Exports of domestic coal and coke from the United States and bunker coal laden on vessels engaged in the foreign trade, at the specified districts, during the month of March, 1917, were as follows:

Districts	Anthracite	Bituminous	Coke
Maine & N. H.	256	1	.....
Vermont	2,481	17,177	496
Massachusetts	43	.....	.....
St. Lawrence	98,331	155,876	3,486
Rochester	295	55,415	2,301
Buffalo	244,575	345,376	57,713
New York	13,720	3,224	505
Philadelphia	3,254	34,540	143
Maryland	.....	22,341	24,544
Virginia	.....	459,706	5,194
Georgia	200	.....	.....
Mobile	.....	4,624	.....
New Orleans	10	831	114
Galveston	.....	3	.....
Laredo	.....	2,332	1,595
El Paso	41	7,732	.....
Eagle Pass	.....	405	652
Arizona	.....	5,144	15,555
So. California	1	22	1
San Francisco	11	4	1,817
Washington	.....	621	3,580
Alaska	.....	10	.....
Dakota	680	2,734	631
Duluth and Superior	657	6,859	76
Michigan	32	184,973	10,549
Ohio	.....	12,177	1,127
Total	364,587	1,322,127	130,079

BUNKER COAL

Districts	Gross Tons
Maryland	34,698
New York	259,970
Philadelphia	28,772
Virginia	192,495

COAL MOVEMENT

Fuel shipments over 13 leading Eastern carriers for February and 2 months of 1916-17 were as follows, in short tons:

Classes and Railroads	February 1916	February 1917	2 Months 1916	2 Months 1917
Anthracite:				
Baltimore & Ohio	140,611	168,254	318,358	352,472
Buffalo, Rochester & Pittsburgh	18,087	10,916	35,266	29,629
Buffalo & Susquehanna	736	285	1,623	1,114
Chesapeake & Ohio	1,075	626	2,359	1,344
Erie	876,074	761,309	1,735,792	1,611,286
Huntingdon & Broad Top Mountain	59	.....	97	124
Pennsylvania	971,580	878,870	2,108,458	1,861,119
Pittsburgh & Lake Erie	74	201	104	216
Pittsburgh, Shawmut & Northern	956	1,493	2,959	3,334
Virginian	45	674	318	1,188
Western Maryland	28,828	38,552	63,616	81,923
Total	2,038,125	1,861,180	4,268,950	3,943,749
Bituminous:				
Baltimore & Ohio	2,828,130	2,473,071	5,686,097	5,437,239
Buffalo, Rochester & Pittsburgh	844,082	624,638	1,731,014	1,432,947
Buffalo & Susquehanna	143,274	110,170	295,935	237,900
Chesapeake & Ohio	2,008,094	1,735,502	4,250,281	3,876,018
Erie	882,338	672,643	1,688,581	1,399,978
Huntingdon & Broad Top Mountain	105,571	111,595	218,885	245,967
New York Central (Buffalo and East)	791,749	612,483	1,522,518	1,385,793
Norfolk & Western	2,300,822	1,927,899	4,666,230	4,418,287
Pennsylvania	4,201,193	3,706,963	8,515,999	7,966,002
Pittsburgh & Lake Erie	972,367	851,231	1,952,614	1,775,202
Pittsburgh, Shawmut & Northern	286,048	129,001	518,784	299,814
Virginian	488,387	452,217	933,606	1,024,407
Western Maryland	598,250	690,339	1,312,286	1,535,918
Total	16,450,305	14,097,752	33,292,830	31,035,472

Financial Notes

VIRGINIAN RAILWAY

The following has been extracted from the annual report of this company for the year ended Dec. 31, 1916:

Coal Properties—Four of the coal operations mentioned in the report for the year ending June 30, 1915, viz.: East Gulf Coal Co., Wood-Sullivan Coal Co., Mead-Tolliver Coal Co., and Beckley Smokeless Coal Co., did not begin shipping until 1916. Of the eight new coal operations mentioned in that report, three have commenced to ship coal, viz., Smith-Pocahontas Coal Co., Fire Creek Smokeless Fuel Co. and Leckie Fire Creek Coal Co.

Two additional operations of the New River Co., viz., Skelton mine (Cranberry No. 2), reached in connection with the P. R. & P. C. R.R. and Dunn Loop mine, reached in connection with the K. G. J. & E. R.R., began shipping during the year. Two other mines on your railway not previously reported also began shipping during the year, viz., Flat Top Pocahontas Coal Co., and Rhodell Coal Co.

ADDITIONAL (11) COAL MINES UNDER WAY AND ACREAGE—TOTAL ACREAGE 7,166

Thermo-Pocahontas Coal Co	1,000
Pickshin Coal Co	405
Lilybrook Coal Co	1,750
Prince-Wick Coal Co	315
Douglas Coal Co	1,200
Walton Construction Co	100
Boone Smokeless Coal Co	500
Bowyer Smokeless Coal Co	1,200
Ragland Coal Co	600
Tolbert Coal Co. (C. & O. Ry. near Cedar)	96

The first six were mentioned also as mines under way in the report of June 30, 1916.

Great Lakes Coal Mining Co.

This company has made the following statement in connection with a bond issue of $775,000 it is making.

The company agrees to pay the present normal Federal income tax of 2%, and any future Federal income tax up to 2%. The bonds are subject to redemption on any interest date in the reverse order of their issue at 102 and int. upon notice, maturities Mar. 1; $80,000 yearly, 1918 to 1923 incl.; $55,000 1924 and $80,000, 1925 to 1927, incl.

Capitalization—Authorized and issued common stock (paid in full), $1,250,000; first mortgage bonds, $1,250,000.

Company—An Ohio corporation has recently purchased from the Roby Coal Co. of Cleveland, O., 5000 acres of solid unmined coal owned in fee, with equipment, etc. (the original acreage being 6600 of which 1600 have been mined), two operating mines operating for about 15 years, in Harrison and Jefferson counties. The coal is known as Pittsburgh or No. 8.

Contract—The company has contracted with the C. Reiss Coal Co. of Sheboygan and the Milwaukee (Wis.) Western Fuel Co., by the terms of which they purchase the entire output for 12 years, beginning Mar. 1, 1917, and pay direct to the trustees, monthly, beginning Apr. 25, 1917, $15,000 per month for the first five years and $15,000 additional on Feb. 25, 1918, and $12,000 monthly thereafter, which payments are more than sufficient to meet the maturing interest and principal, which amounts to an unconditional guaranty.

Property—The mines are fully equipped with dwellings, equipment, etc. The property could not be replaced for less than $1,000,000. The mines are electrically equipped and the property is a cheap producer. It contains an estimated minimum of 25,000,000 tons of recoverable coal, with a possible 30,000,000 tons, and is said to be worth $400 per acre. The total value of the coal in the ground is $2,000,000. Daily capacity, 4000 tons. A fair royalty on this coal from the present until mined, working at rated capacity, would be not less than 20c. per ton, assuring a minimum earning of $5,000,000.

GREAT BRITAIN

May 3—There has been a very considerable jump in prices owing to large Admiralty demands. Free coal is scarce. The demand is likely to continue.

Best Welsh steam	Nominal
Best seconds	Nominal
Seconds	$7.44@7.68
Best dry coals	6.24@6.48
Best Monmouthshires	7.20@7.44
Seconds	6.48@6.72
Best Cardiff smalls	4.80@5.04
Cargo smalls	4.32@4.56

The prices for Cardiff Coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both nett, exclusive of wharfage.

Freights—Free tonnage continues scarce, and high rates are maintained in all directions.

Gibraltar	$19.80	Port Said	$28.80
Marseille	21.54	Las Palmas	18.00
Genoa	24.30	St. Vincent	19.20
Naples	23.58	River Plate	26.40
Alexandria	28.80		